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RECENT STUDIES ON THE CONSTITUTION OF THE ALKALOIDS.

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The sciences of to-day present, as might be expected, a very different aspect from the same branches of knowledge as they appeared fifty or sixty years ago. It is not merely that the mass of observations in most of these lines of study has enormously increased during this interval. Were that all, the change could hardly be considered as an unmixed benefit, because of the increased difficulty of assimilation of this additional matter. Many would be the contradictions in the observations and hopeless would be the task of bringing order out of such a chaos. The advance in the several branches of knowledge has been largely one resulting from improved methods of study, rather than one following simply from diligence in the application of the old ways.

Let us turn to chemistry for our illustration of this. The chemistry of the last century and the early decades of this was largely a descriptive science, such as the natural history branches, zoology, and botany are still in great part. Reasonably exact mineral analyses were made, it is true, but the laws of chemical combination and the fundamental conceptions of atoms and molecules had not been as yet generally established. Now, this want of comprehensive views of chemical reactions, their why and wherefore, was bad enough as it affected the study of inorganic and metallic compounds, but what must have been the conditions for studying the complex compounds of carbon, so widely spread in the vegetable and animal kingdoms. Their number is so enormous that, in the absence of any established relationships, not much more than a mere enumeration was possible for the student of this branch of chemistry. It is only within the last twenty years that chemists have attained to any comprehensive views at all in the domain of organic chemistry. It has been found

possible to gradually range most carbon compounds under two categories, either as marsh-gas or as benzol derivatives, as fatty compounds or as aromatic compounds. To do this, methods of analysis very different from those used in mineral chemistry had to be applied. The mere finding out of percentage composition tells us little or nothing about an organic compound. What the elements are that compose the compound is not to be found out. That can be told beforehand with almost absolute certainty. What is wanted is to know how the atoms of carbon, hydrogen, oxygen, and nitrogen are linked together, for, strange to say, these differences of groupings, which may be found to exist between these three or four elements, endow the compounds with radically different properties and serve us as a basis of classification.

The development of this part of chemistry, therefore, required very different methods of research. Instead of at once destroying a compound in order to learn of what elements it was composed, we submit it to a course of treatment with reagents, which take it apart very gradually, or modify it in the production of some related substance. In this way, we are enabled to establish its relations with well-defined classes and to put it in its proper place. Of equal importance with the analytical method of study, however, is the synthetical. This method of research, as applied to organic compounds, embodies in it the highest triumphs of modern chemistry. It has been most fruitful of results, both theoretical and practical. Within recent years, hundreds of the products of vegetable and animal life have been built up from simpler compounds. Thousands of valuable dye-colors and other compounds used in the arts attest its practical value. It may, therefore, seem anomalous when I say that one of the most important of all the classes of organic compounds has not shared in this advance. The alkaloids, that most important class from a medical and pharmaceutical point of view, have until quite recently been defined in the books simply as "vegetable bases, containing nitrogen." Whether they were marsh-gas or benzol derivatives was not made out; how the four elements, carbon, hydrogen, oxygen, and nitrogen, were grouped together in them was absolutely a thing unknown. Chemists all admitted two things—first, that their constitution was very complex, and, second, that the synthesis of any of the more important medicinal alkaloids would be an eminently desirable thing to effect from every point of view. Within the last five years, however, quite con-

siderable progress has been made in arriving at a clearer understanding of these most important compounds, and I shall offer to your attention this evening a brief statement of what has been done and what seems likely to be accomplished in the near future.

It was early recognized that the alkaloids were complex amines or ammonia derivatives. The more or less strongly marked basic character of these bodies, the presence of nitrogen as an essential element, and, above all, the analogy shown to ammonia in the way these bases united with acids to form salts, not by replacement of the hydrogen of the acid, but by direct addition of acid and base, pointed unmistakably to this constitution. But with this granted, the simplest alkaloid formulas, those of conine, $C_8H_{17}N$, and nicotine, $C_{10}H_{14}N_2$, still showed that the amine molecule contained quite complex groups of carbon and hydrogen atoms, and the great majority of the alkaloids—the non-volatile ones—contained groups in which the three elements, carbon, hydrogen, and oxygen, all entered. Hence the difficulty in acquiring a knowledge of the molecular structure of those alkaloids at all comparable with that attained in the case of other organic compounds. Of course synthesis could not be applied until analysis had revealed something of the molecular grouping of these compounds, so the action of different classes of reagents was tried upon the alkaloids. Before summarizing the results of this study of the decomposition and alteration products of the alkaloids, a brief reference to a related class of organic compounds will be of assistance to those unfamiliar with recent researches in this field.

It is well known that in coal-tar is found a series of ammonia-like bases, aniline or amido-benzol, toluidine or amido-toluol, and xylidine or amido-xylol, which are utilized practically in the manufacture of the so-called aniline dye-colors. It is perhaps not so well known that there are other series of bases found there too. The first of these is the pyridine series, including *pyridine*, C_5H_5N, *picoline* (methyl-pyridine) $C_5H_4N(CH_3)$, *lutidine* (dimethyl-pyridine) $C_5H_3N(CH_3)_2$ and *collidine* (trimethyl-pyridine) $C_5H_2N(CH_3)_3$. This series is also found in relatively larger proportion in what is known as Dippel's oil, the product of the dry distillation of bones.

The second series is the quinoline series, including *quinoline* C_9H_7N, *lepidine* (methyl-quinoline) $C_{10}H_9N$, and *cryptidine* (dimethyl-quinoline) $C_{11}H_{11}N$. The two compounds which give name to these series, pyridine, C_5H_5N, and quinoline, C_9H_7N, respectively, bear to each

other a relation analogous to that existing between benzol, C_6H_6, and naphthalene, $C_{10}H_8$, and the theory generally accepted by those chemists who have been occupying themselves with these bases and their derivatives is that pyridine is simply benzol, in which an atom of nitrogen replaces the triad group CH, and quinoline, the naphthalene molecule with a similar change. Indeed, Ladenburg has recently succeeded in obtaining benzol as an alteration product from pyridine in certain reactions. Moreover, from methyl-pyridine, $C_5H_4N\ (CH_3)$, would be derived an acid known as pyridine-carboxylic acid, $C_5H_4N\ (COOH)$, just as benzoic acid, C_6H_5COOH, is derived from methyl-benzol, $C_6H_5CH_3$, and from dimethyl-pyridine, $C_5H_3N\ (CH_3)_2$, an acid known as pyridine-dicarboxylic acid, $C_5H_3N\ (COOH)_2$, just as phthalic acid, $C_6H_4\ (COOH)_2$, is derived from dimethyl-benzol, $C_6H_4\ (CH_3)_2$. The same thing applies to quinoline as compared to naphthalene.

We may now look at the question of the decomposing effect of reagents upon the alkaloids. The means which have proved most efficacious in decomposing these bases are the action of oxidizing and reducing agents, of bromine, of organic iodides, of concentrated acids and alkalies, and of heat.

Taking up the volatile alkaloids, we find with regard to *Conine*; first, that the action of methyl iodide shows it to be a secondary amine, that is, it retains only one replaceable hydrogen atom of the original ammonia molecule. Its formula is therefore $C_8H_{16}NH$. From conine can be prepared methyl-conine, which also occurs in nature and dimethyl-conine. From this latter has been gotten a hydrocarbon C_8H_{14}, conylene, homologous with acetylene C_2H_2. Conine, on oxydation, yields chiefly butyric acid, but among the products of oxidation has been found the pyridine-carboxylic acid before referred to. The formula of conine, $C_8H_{17}N$, shows it to be homologous with piperidine $C_5H_{11}N$, a derivative of piperine, the alkaloid of pepper, to be spoken of later, and, just as piperidine is derived from pyridine by the action of reducing agents, so conine is probably derived from a propyl-pyridine. The artificial alkaloid paraconine isomeric with the natural conine will be referred to later.

Nicotine, $C_{10}H_{14}N_2$, the next simplest in formula of the alkaloids, is a tertiary base, that is, contains no replaceable hydrogen atoms in its molecule. It shows very close relations to pyridine. When nicotine vapor is passed through a red-hot tube, it yields essentially collidine, and with this, some pyridine, picoline, lutidine, and gases such as

hydrogen, marsh gas and ethylene. Heated with bromine water to 120°C, it decomposes into bromoform, carbon dioxide, nitrogen and pyridine. When its alcoholic solution is treated with ferricyanide of potassium it is oxidized to dipyridine $C_{10}H_{10}N_2$. Potassium permanganate, chromic or nitric acid oxidises it to nicotinic acid, $C_6H_5NO_2$, which is simply pyridine-carboxylic acid, $C_5H_4N(COOH)$, and which, distilled over quick-lime, yields pyridine C_5H_5N.

Turning now to the non-volatile and oxygenized bases, we take up first the opium alkaloids. *Morphine*, $C_{17}H_{19}NO_3$, is a tertiary amine, and appears to contain a hydroxyl group like phenols, to which class of bodies it has some analogies, as is shown in its reaction with ferric chloride. Its methyl ester, which can be formed from it, is *Codeine*, one of the accompanying alkaloids of opium. Besides the methyl derivative, however, others are possible, and several have been recently prepared, giving rise to a class of artificial alkaloids known as *codeines*. Morphine, rapidly distilled over zinc dust, yields phenanthren, trimethyl-amine, pyrrol, pyridine, quinoline, and other bases. The action of strong hydrochloric acid upon morphine changes it into apomorphine $C_{17}H_{17}NO_2$ by the withdrawal of a molecule of water. Ferricyanide of potassium and caustic soda solution change morphine into oxydimorphine, $C_{34}H_{36}N_2O_6$. When heated with strong potassium hydrate, it yields methylamine.

Narcotine, another of the opium alkaloids, when heated with manganese dioxide and sulphuric acid, is oxidised and splits apart into opianic acid, $C_{10}H_{10}O_5$, and cotarnine, $C_{12}H_{13}NO_3$. This latter, by careful oxidation, yields apophyllenic acid, $C_8H_7NO_4$, and this, on heating with hydrochloric acid to 240° C, yields pyridine-dicarboxylic acid, $C_5H_3N(COOH)_2$. The base cotarnine also results from the prolonged heating of narcotine with water alone. In this case, instead of opianic acid, its reduction product meconine, $C_{10}H_{10}O_4$, is produced.

Meconic acid, $C_7H_4O_7$, which is found in opium in combination with the different bases, has also been investigated. By acting upon meconic acid with ammonia, comenamic acid is formed, and this latter, when heated with zinc dust, yields pyridine.

If we go now to the cinchona alkaloids, we meet with exceedingly interesting results. *Quinine*, $C_{20}H_{24}N_2O_2$, when carefully oxidised with chronic acid or potassium permanganate, yields a series of products. First is formed quitenine, $C_{19}H_{22}N_2O_4$, a weak base, then quininic acid, $C_{11}H_9NO_3$, then the so-called oxycinchomeronic acid,

$C_8H_5NO_6$, and finally cinchomeronic acid, $C_7H_5NO_4$. Now the two acids last mentioned are simple substitution products of pyridine, oxycinchomeronic acid being a pyridine-tricarboxylic acid $C_5H_2N(COOH)_3$, and cinchomeronic acid, a pyridine-dicarboxylic acid, $C_5H_3N(COOH)_2$. When distilled with potassium hydrate, quinine yields quinoline and its homologues. The alkaloid has been shown to be a tertiary base.

Quinidine yields with chromic acid the same decomposition products as quinine.

Cinchonine, $C_{19}H_{22}N_2O$, the second most important alkaloid of these barks, when oxidised with potassium permanganate, yields cinchonic acid, which is a quinoline-carboxylic acid $C_9H_6N(COOH)$, cinchomeronic acid, which has just been stated to be a pyridine-dicarboxylic acid, and a pyridine-tricarboxylic acid. When cinchonine is treated with potassium hydrate, it is decomposed into quinoline and a solid body, which on further treatment yields a liquid base C_7H_9N, which is probably lutidine. It has been found, moreover, that both tetrahydroquinoline and dihydroquinoline, hydrogen addition products of quinoline, are present. When cinchonine is distilled with solid potassium hydrate, it yields pyrrol and bases of both the pyridine and quinoline series.

Cinchonidine, when heated with potassium hydrate, yields quinoline also, and with nitric acid the same products as cinchonine.

Strychnine has been found to be a tertiary amine. When distilled with potassium hydrate, quinoline is formed.

Brucine is a tertiary diamine, that is, formed by substitution in a double ammonia molecule. When distilled with potassium hydrate it yields quinoline, lutidine, and two isomeric collidines.

The alkaloid *Atropine* has been quite thoroughly studied with results of great interest. When heated with either baryta-water or hydrochloric acid, it takes up a molecule of water and is split into tropine, $C_8H_{15}NO$, and tropic acid, $C_9H_{10}O_3$. This latter is phenyl-oxypropionic acid. Tropine, when heated to 180° C, with concentrated hydrochloric acid, splits off a molecule of water, and yields tropidine, $C_8H_{13}N$, a liquid base, with an odor resembling conine. When this tropidine is heated with an excess of bromine, it yields dibrompyridine.

Piperine, the alkaloid of pepper, has also been well-studied. When boiled with alcoholic potash solution, it takes up a molecule of water

and splits apart into piperic acid, $C_{12}H_{10}O_4$, and piperidine, $C_5H_{11}N$. This latter base has been shown to be a hydrogen addition product of pyridine, C_5H_5N. When heated with concentrated sulphuric acid, it is oxidised to pyridine. Piperidine hydrochlorate, also, when heated with excess of bromine to 180° C, yields dibrompyridine.

Sinapine, the alkaloid which exists as sulphocyanate in white mustard seed, yields under the same reaction as that applied to atropine and piperine, quite different results. When boiled with baryta water, sinapine decomposes into sinapic acid, $C_{11}H_{12}O_5$, and choline, $C_5H_{15}NO_2$, the latter a well-known constituent of the bile, and produced also in the decomposition of the lecithin of the brain and yolk of egg.

Cocaine, the alkaloid of coca leaves, is decomposed by heating with hydrochloric acid into methyl alcohol, benzoic acid and a crystalline base ecgonine, $C_9H_{15}NO_3$.

Caffeine and *theobromine* have also quite different relations. Caffeine, it will be remembered, is the methyl ester of theobromine, and can be prepared from it. When caffeine is carefully oxidised with chlorine, it yields dimethyl-alloxan and methyl-urea. Both theobromine and caffeine are decomposed by heating to 240° C in sealed tubes with hydrochloric acid, identical products being obtained. These products are carbon dioxide, formic acid, ammonia, methylamine, and sarcosine, the last three being of course in combination with the excess of hydrochloric acid. The artificial preparation of theobromine and caffeine from xanthine, and guanine also shows clearly their relations.

If, having completed our survey of what has been done in the way of decomposing the alkaloids by the different classes of reagents, we review the field, it will be seen that with all the alkaloids mentioned, except the last four, a more or less immediate connection with the pyridine and quinoline bases has been indicated. The conviction accordingly forces itself upon us that, if we want to attack the problem of building up any of these important alkaloids artificially, we must turn to these bases as our starting point.

As already stated, both series occur in coal-tar and the pyridine series also more abundantly in bone-oil. Pyridine, picoline, lutidine, and collidine, the first four members of the pyridine series, have, moreover, all been formed synthetically, although the processes are not such as would yield the products as cheaply as they can be gotten from Dippel's oil. Quinoline, the first member of the higher series, had

been made synthetically by several chemists, but by expensive and involved methods, when Skraup, in 1881, effected its synthesis from nitrobenzol and glycerin, or still better, a mixture of nitrobenzol and aniline with glycerin. This process allows of its being made on a commercial scale if desirable. Shortly after, by an application of the same principle, Döbner and Miller effected the synthesis of lepidine, the second member of the quinoline series.

At the same time that this general agreement to consider these bases as the starting point in the endeavor to effect the synthesis of the natural alkaloids had been arrived at by chemists, it was thought well to look into the question whether these bases and their immediate derivatives had any therapeutic value of their own.

Piperidine, the decomposition product of piperine, which we have shown may be considered to be hexahydropyridine, was examined by Dr. Kronecker, of Berlin, at the request of Prof. Hofmann, and was found to have an action upon animals in many respects resembling that of conine. Prof. Filehne, of Erlangen, who has studied a large number of these pyridine and quinoline derivatives, found, moreover, that the hydrochlorate of ethyl-piperidine had a physiological action quite analogous to that of conine.

The physiological action of quinoline itself has been studied quite extensively by Donath and others, and it was found that several of its salts were quite valuable febrifuges, acting very like quinine, and capable in cases of being used as a substitute for it. In general, the hydrogen addition products were found to be more active than the simple base, an observation entirely in accord with the theory formed by Wischnegradsky, and by Königs, as the result of the study of the decomposition products of the alkaloids, viz., the alkaloids are in general hydrogen addition products of pyridine and quinoline, or of the two bases combined. Thus, Prof. Filehne found that hydrochlorate of tetrahydroquinoline was much more energetic in its action than quinoline, but could not be used on account of a too powerful local effect. The hydrochlorate of dimethyl-tetrahydroquinoline, which was distinguished by its strong bitter taste, much resembling that of quinine, had an effect like that of curare poison. The most decided febrifuge action, however, was found by Prof. Filehne to reside in the hydrochlorate of oxyhydro-methyl-quinoline, introduced to public notice by Prof. O. Fischer uuder the name of "Kairin," and in the acid sulphate of tetrahydro-methylquinoline, introduced under the name of "Kairo-

lin." These compounds had a very surprising febrifuge action, without any unpleasant after effects or local disturbances.

The most active workers in the field of synthetic formation of the alkaloids have been Wischnegradsky, of St. Petersburg,—who, unfortunately for science, died at an untimely age in 1880,—Königs and Fischer, of Munich, and Ladenburg, of Kiel. The study of the decomposition products of the cinchona alkaloids especially points quite distinctly to the probable existence in quinine of a hydrogen addition product of pyridine, in combination with a methyl-quinoline group. The many experiments that are now being made to test this and other questions that suggest themselves will not long leave us in the dark. Whether a practical commercial synthesis of quinine will follow is another matter, but it is within the bounds of possibility, or perhaps even of probability.

It must not be supposed that no syntheses of alkaloids have been effected as yet. By heating butyl-aldehyde with alcoholic ammonia is formed *paraconine*, an alkaloid isomeric with the natural conine, but differing in physiological action. By the action of sodium upon pyridine is produced a compound $C_{10}H_8N_2$, known as dipyridyl, and this, under the influence of nascent hydrogen, takes up six atoms and becomes *isonicotine* $C_{10}H_{14}N_2$, a physiologically active alkaloid, isomeric with the true nicotine. The formation of a series of alkaloids under the name of *codeines*, by the substitution of other organic radicals instead of methyl in the codeine reaction, has already been alluded to. *Atropine* can be formed by uniting tropine and tropic acid, the two decomposition products already noted. The latter of these products is already shown to be capable of synthetical formation, and the other will no doubt be formed in the same way. The artificial atropine is identical with the natural alkaloid. Ladenburg has also formed a series of artificial alkaloids, called *tropeines*, by uniting the base tropine with different organic acids, as in the case of the compound of mandelic acid and tropine known as *homatropine*, an alkaloid of action similar to atropine, but possessing some decided advantages in its use. *Piperine* has also been made by the uniting of piperidine and piperic acid, and, as piperidine has already been formed from pyridine, we have here a true synthesis also. Both *theobromine* and *caffeine*, its methyl derivative, have been made from xanthine, which itself can be formed from guanine, a constituent of guano.

We may conclude, from this reference to what has been done in the

last few years, that the reproach mentioned in first speaking of the alkaloids as a class, that almost nothing was known of their constitution, will not long remain, and that as their molecular structure is laid bare in these studies now being made, keen-sighted chemists will effect their artificial formation. When these most valuable compounds can be made by exact methods, in a state of entire purity, and at a cost much below that paid for the present extraction of them from relatively rare plants, organic chemistry will have placed all of us under obligations as great as those owing any branch of science, no matter how practical we call it.

BISMUTH SALICYLATE.

By L. Wolff, M.D.

[Read at the Pharmaceutical Meeting, October 16, 1883.]

In a recent number of the "American Journal of Pharmacy" mention was made of this article as a new remedial substance, along with an interesting account of its use and some of its properties. The "New Remedies," as well, had notes upon the subject in both the September and October numbers, giving therein, also, directions for its preparation, which, however, are not sufficient to obtain a pure salicylate, but only a mixture of the subnitrate and salicylate thereof.

Bismuth is well known to exist in combinations both as bismuthous and bismuthyl salts, the former on addition of water changing into the latter group. Weaker organic acids, however, will not enter into combination directly with so-called metallic bismuth, and we have to depend, therefore, for its preparation on double decomposition with other salicylates the bases of which have greater affinity for the acid radical of the bismuthous salt. The bismuthous salts being precipitated from their acid solutions by water, would in such decompositions give rise to the precipitation of considerable bismuthyl salts in addition to the salicylate so formed. Thus, as proposed in the September number of "New Remedies," if an acid solution of bismuth nitrate be employed, a mixture of bismuthyl nitrate and salicylate with salicylic acid would inevitably result. If, as proposed in the same journal of October, an acid bismuthous chloride solution were used, a similar result with bismuthyl chloride would ensue. As bismuthyl carbonate cannot be decomposed by salicylic acid, a direct salicylate is thus impossible, though bismuth teroxide, if freshly prepared from bismu-

thyl nitrate, with solution of sodium or potassium hydrate, will combine with salicylic acid when boiled with a concentrated solution of the acid for some time.

The reaction is a direct one, and would be expressed as follows:

$$Bi_2O_3+2C_7H_6O_3=2BiOC_7H_5O_3+H_2O.$$

As in this process, however, there seems to be always more or less undecomposed bismuth teroxide present, it is safer to produce it by double decomposition, with proper measures preventing the formation of other bismuthyl salts than the one desired.

After experimentation to that end, I found that a glycerin solution of crystallized bismuthous nitrate bore dilution with one to two parts of water before precipitating the bismuthyl nitrate, and acting on this I made a concentrated solution of sodium salicylate, with which I decomposed the glycerin solution of crystallized bismuthous nitrate, obtaining thus a bismuthyl salicylate, sodium nitrate, free nitric acid, salicylic acid and water, which were removed with water, and the still adhering salicylic acid removed by washing with hot water and subsequently alcohol. The reaction occurring under these circumstances with the sodium salicylate, as given in the U. S. Pharmacopœia as $2NaC_7H_5O_3.H_2O$, would be expressed:

$$Bi3NO_3.5H_2O+2NaC_7H_5O_3.H_2O=$$
$$BiOC_7H_5O_3+2NaNO_3+C_7H_6O_3+NO_3H+5H_2O.$$

As the bismuthyl salicylate treated with a concentrated solution of sodium bicarbonate yielded bismuthyl carbonate and sodium salicylate, I inferred that bismuthyl nitrate would yield, also, on boiling with a concentrated solution of sodium salicylate, a bismuthyl salicylate, which I found to be the case, the reaction being as follows:

$$2BiONO_3H_2O+2NaC_7H_5O_3.H_2O=$$
$$2BiOC_7H_5O_3+2NaNO_3+3H_2O.$$

The precipitate, being well washed with hot water, presented the same appearance as by either of the previous methods, and when dried and combusted on the platinum foil grew dark brown, and burnt off to the greater part with evolving phenol vapors.

The salicylate of bismuth presents a slightly pinkish appearance and is of a granular consistence, which is not readily overcome to an impalpable powder in the mortar. Under the microscope it is easily distinguishable from the subnitrate by being of a distinct granular character,

the granules of even size, reminding of the conidia of fungoids, while the former consists of uneven broken crystals.

In water, glycerin, alcohol and ether it seems insoluble, while its solution in acids is probably due to its decomposition, and formation of bismuthous salts. Tests for its purity are the absence of acid reaction of water boiled with it (salicylic acid), its rapid combustion on platinum foil, with liberation of phenic odors, free from nitrous acid vapors, and lastly its distinct granular appearance without crystalline fragments under the microscope (bismuthyl nitrate).

If it proves what has been claimed for it, it will certainly be a most important addition to our store of remedial agents, but its slow demand amidst the vast material for its application where it could be certainly used with impunity leaves the latter question somewhat in doubt.

IMPROVED METHOD OF EXHAUSTING DRUGS.

By Alfred B. Taylor.

For some years past I have employed a process for making some of the fluid extracts, tinctures, etc., of the Pharmacopœia, which has proved very satisfactory. The plan has probably occurred to others, but I have never seen it published, nor have I ever heard it suggested by any one, and I have thought a notice of it might be acceptable to the readers of the Journal.

I have found it especially serviceable in making those preparations which are made from drugs that are difficult to exhaust with small quantities of menstruum.

The process consists in using a portion of the finished preparation (from a previous operation) to macerate and partially exhaust the drug before using the new portion of menstruum, and as there is no limit to the quantity of finished preparation that can be used where necessary, it is possible to exhaust completely the drug operated on.

For example, let it be required to make two pints of tincture of arnica flowers.

Take of Arnica flowers, in No. 20 powder	6 oz. av.
Tincture of arnica flowers	2 pints.
Diluted alcohol, a sufficient quantity to make	4 pints.

Moisten the powder with a pint of the tincture of arnica flowers, and macerate for twenty-four hours; then pack it firmly in a cylin-

drical percolator, and gradually pour upon it, first the remainder of the tincture of arnica flowers, and afterward diluted alcohol, until four pints of tincture are obtained.

I have used this process with great advantage in making the fluid extract and the tinctures of cinchona.

SYRUP OF WILD CHERRY.

By R. Rother.

If the statement is correct in regard to the yield of cyanhydric acid from wild cherry bark, then the syrup of this drug must be a more potent preparation than is generally granted. It is alleged that the best wild cherry bark, gathered in October, produces ·1436 per cent. of cyanhydric acid, and that in addition the bark contains at this period of the year the largest amount of tannin and peculiar bitter principle. The cyanhydric acid, or rather the constituents that produce it are by all means the most essential part of the drug. The bitterness and astringency are, however, also of sufficient importance to demand particular attention. With the stated amount of absolute acid in the bark the syrup would contain $\cdot1436 \times 50 \times \cdot12 = \cdot8616$ per cent. of the official acid by weight, or somewhat over one per cent. by volume. This shows that an ordinary teaspoonful of such a preparation represents approximately one minim of official cyanhydric acid. With an appropriately fine powder, of the requisite quality, in a carefully conducted operation that standard could perhaps be uniformly attained. But owing to the fact that syrup of wild cherry is not usually conceded to be anything more than a mere adjuvant, its proper preparation is generally unduly neglected. Under this adverse condition it is probable that syrup of wild cherry is but feebly representative of its most powerful constituent. The keeping qualities of the syrup are ordinarily good during a moderate period of storage. But in the generality of cases, with longer time and frequent exposure deterioration and decomposition become so marked as to call, emphatically, for some preservative.

The decomposition is of several kinds. The first that appears results from the formation of mould over the surface, assuming a more tangible form in the larger storage vessels that are not so often handled. This stage of decomposition is mainly confined to the surface, and hence the lower stratum, when carefully separated from the supernatant fungus, is not materially damaged.

The second stage of change consists in positive fermentation whereby the syrup becomes roiled, soured, and generally stale and worthless.

The third stage of deterioration is characterized by the disappearance of the cyanhydric acid, either by evaporation or positive destruction during the fermentative decay. Another change of a peculiar kind is also often noticeable, although in itself not vicious. It seems to be due to the normal presence in the drug of a chemical ferment which rapidly changes the sugar of the syrup into an amorphous deliquescent form. This action may result from the synaptase, but it is more probably effected through a distinct agency. The objection to this species of alteration is that it renders the syrup more conducive to the positively deleterious influences above noted.

Excepting the last, all of these changes are injurious enough, but although the fermentation renders the syrup wholly unfit for use from an æsthetic point of view, the dissipation of the cyanhydric acid causes almost absolute worthlessness, from a therapeutic point of view.

Knowing the relative amount of cyanhydric that the syrup should contain, an article deteriorated simply in the loss of this agent, can be easily regenerated by the requisite addition of the acid and some oil of bitter almonds. In fact, a very definite and practical method for producing this syrup, de novo, would consist in extracting the astringency and bitterness to the exclusion of the synaptase, and completing the syrup by the addition of the known proportion of cyanhydric acid and oil of bitter almond. Since in such a process it becomes essential to employ a fresh and full strength cyanhydric acid, the writer finds it opportune to interpolate a few remarks on this subject, and finally append a formula for such a preparation.

The first formula of the Pharmacopœia for cyanhydric acid, however excellent it may be in large operations, is not suited as a process for the shop. The second formula to be used as an alternate process expressly for the counter, is badly defective in a practical aspect, although theoretically splendid. The argentic cyanide is one of the most reluctant substances to manipulate for a body having such a bland appearance. It adheres most obstinately to everything, so that its accurate weighing and admixture with acidified water becomes almost impossible. Furthermore the layer of argentic chloride prevents a perfect decomposition, and hence the liquid ultimately contains an excess of chlorohydric acid, and a corresponding deficiency of cyanhydric acid. It is strange that the Pharmacopœia embodied the first

formula, which is in reality only adaptable to factories, and doubly strange that it did not incorporate such an excellent and simple process as that given in Fownes' chemistry. This process is equally applicable to large and small operations, and yields a definite and permanent product, and is therefore unlike that of either of the official methods. It consists in decomposing pure potassic cyanide with tartaric acid in the presence of water and alcohol, as follows:

$$KCy + H_2T = Hcy + KHT.$$

Pure potassic cyanide is as easily obtainable as argentic cyanide, and is ultimately cheaper. There are, strangely enough, but few among the numerous cyanides that are available for the purpose of generating cyanhydric acid fit for medicinal use. Soluble or insoluble they are mostly indefinite and intractable substances. Mercuric cyanide, which might be so useful for this purpose, is much to be regretted undecomposable by those acids, which would render the complete removal of the mercury possible. Hydric sulphide completely decomposes it, and hence the writer attempted to employ the oxysulphides of antimony for this purpose. Although these methods generated cyanhydric acid abundantly and promptly, they yet failed to precipitate the mercury completely. Owing to the great affinity of mercury for the compounds of carbonic sulphide (also called carbon disulphide), it may be that some such combination could be found to answer the purpose.

The formula for cyanhydric acid transcribed from Fownes' is as follows:

Potassic cyanide, pure,	65 parts.
Tartaric acid,	150 "
Alcohol,	675 "
Water sufficient to make	1538 "

Mix the potassic cyanide and tartaric acid with 500 parts of water, in a well-stopped bottle, or dissolve each separately in 250 parts of water, and mix the solutions; then add the alcohol and sufficient more water to make 1538 parts. The alcohol may also be mixed with 500 parts of water, first the two salts be then added, and enough water to make 1538 parts as before. After the hydropotassic tartrate has subsided as a heavy crystalline powder, the clear supernatant liquid is decanted.

The yield of official acid is 1350 parts, but the generated cream of tartar weighs 188 parts, thus making the 1538 parts as above directed. The solution contains mere traces of the acid tartrate.

The Pharmacopœia, recognizing the necessity of adding a preservative to the syrup of wild cherry, resorted to glycerin. It is, however, rather late in the day to employ glycerin for that purpose, more especially when so sparingly applied. Five per cent. of glycerin is contained in the new official syrup, but it is safe to say that 20 per cent. would not suffice in any case where there is a well-marked tendency to fermentative decomposition. Alcohol would have been amply sufficient at 4 per cent., and should have been used. The writer in this instance strongly recommends alcohol, not alone for its simple preservative effect, but since it also serves another important purpose with equal efficiency.

Several years since the writer employed an odd looking sample of bark for preparing the syrup, and found that little if any cyanhydric acid was developed. The bark possessed bitterness and astringency in moderate degree, and was therefore kept with a view to employ it in alcoholic mixtures containing wild cherry as one of the ingredients. On employing this bark on such an occasion with a 25 per cent. alcohol, cyanhydric acid was quite freely developed. This rather astonishing result showed that a moderate proportion of alcohol did not only not check the generation of the acid, but even caused its appearance where water alone had been powerless. Whilst glycerin, under such circumstances would have retarded or more or less obstructed the production of cyanhydric acid, it would not have obviated the fermentation. Subsequently the writer applied one-eighth alcohol in preparing the syrup, and found that, primarily, it prevented all deterioration, and secondarily, whilst facilitating the production of cyanhydric acid, also yielded a clearer and generally more satisfactory percolate. Substituting the glycerin in the official process by alcohol, the formula then becomes modified as follows:

Wild cherry in No. 20 powder, . .	12 parts
Sugar, granulated, ...	60 "
Alcohol, sufficient, or . . .	4 "
Water, sufficient to make . . .	100 "

Mix alcohol and water in the proportion of 1 part of the first and 7 parts of the latter and moisten the wild cherry with 6 parts of this mixture. Pack the moistened bark firmly into a glass percolator and pour on of the above mixture until the liquid has slowly penetrated to the bottom of the column. Now check the percolation for 24 hours by closing the exit. On resuming the operation let the current

slowly flow so that in the course of 12 hours 40 parts of percolate is obtained. Pour three-fourths to four-fifths of this upon the sugar contained in a bottle and agitate occasionally until no more sugar is dissolved. Decant the clear syrup from the residuary sugar, and pour on this the remainder of the percolate, agitating again as before, until all the sugar has dissolved. Finally mix the two syrupy solutions and strain through a No. 80 sieve.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Syrup of iodide of iron.—Percy Wells found that glycerin alone would preserve a solution of ferrous iodide, but on mixing it with syrup the usual difficulties were met with. To overcome these, the author now adds about an equal bulk of glycerin to the aqueous solution of the salt, heats to 212°F., and filters into the requisite quantity of cold glucose syrup. After stirring with an iron spatula the mixture will be turbid for about an hour, but afterwards becomes bright and of a very pale green color, and remains unaffected by time or temperature.—*Phar. Jour. and Trans.*, August 4, 1883, p. 82.

Pungency of tincture and liniment of iodine.—That these preparations, if made with methylated spirit, sometimes develop considerable pungency, has been shown by MacEwan and by Gregory, both attributing this change to the presence of allylalcohol, which is one of the constituents of crude wood spirit. W. H. Darling directs attention to acetone, present in considerable quantity in crude wood spirit, as the probable cause of this pungency; for the halogen substitution products of acetone are of an extremely irritating nature, much beyond the allyl compounds in this particular.—*Phar. Jour. and Transactions*, July 14, 1883.—We have seen a sample of decolorized tincture of iodine made with sodium hyposulphite and ammonia (formula of Phar. Germ. I) which had a strong pungent odor resembling that of volatile oil of mustard; made with a different alcohol, the pungency was not developed.

Perosmic acid is a new remedy employed by Prof. Winiwarter in cancerous and scrofulous swellings. It is used by injecting daily 3 drops of a one per cent. solution of the acid, which treatment causes the tumor to soften and decrease in size, the dead tissue is thrown off and

disappears in about a month. No curative effects upon cancer itself have been observed from the remedy.—*Rundschau, Leitm.*, June 20, 1883.

Adulterated verdigris has been observed by Astre. After dissolving the copper salt with water and acetic acid, there remained an insoluble residue amounting to 10·36 per cent. and consisting of a silicious earth colored with Prussian blue.—*Jour. Phar. Chim.*, May, 1883, p. 386.

Substitution for verdigris.—Professor N. Gille has repeatedly met with verdigris in the Belgian market which was a blue-green crystalline powder, almost completely soluble in water, and when exsiccated by heat lost about 10 per cent. of water. On analysis it yielded cupric oxide 44, anhydrous acetic acid 41, water 10, and impurities 5 per cent. The article seems to be the product of a special process, differing from that by which ordinary verdigris is prepared, when sheets of copper are left in contact with grape husks. A product very similar to the one alluded to above is obtained by leaving copper in contact with cloth saturated with vinegar; this being chiefly normal copper acetate, it should be remembered that its action is far more energetic than that of verdigris.—*Ann. Belges de Médec. Vétér.*

Decomposition of oxalic acid.—On two occasions G. Fleury observed that titrated solutions of oxalic acid completely lost their acid reaction in the course of a few years, a considerable quantity of cryptogamic vegetation making its appearance at the same time. On the other hand, a solution containing 6·3 gm. of oxalic acid per liter did not show any alteration in four years.—*Jour. Phar. Chim.*, May, 1883, p. 387.

Carbolic acid.—From the results of a series of experiments, W. Meyke arrives at the following conclusions: 1. Pure carbolic acid should be colorless, have the proper boiling-point, and be entirely volatilized by heat. 2. The congealing-point is of secondary importance. 3. Carbolic acid is colored red when kept in glass vessels containing lead. 4. The best vessels for keeping carbolic acid are made of tinned sheet-iron.—*Phar. Zeits. Russl.*, 1883, 425–432.

Sulpho-carbolate of sodium has acted admirably in cases of rheumatic fever. For adults, Dr. Greenway, M. R. C. S., Plymouth, prescribes 15 grains every six hours in ℥iss. of water. Ordinary precautions of administering an occasional aperient, placing the patient between blankets, and keeping him on milk diet must not be neglected.

Tooth wash.—A tincture is made from chips of cedar wood, such as is used for the finer qualities of lead pencils, by treating 1 part of it with 5 parts of brandy. In 250 gm. of this tincture dissolve oil of peppermint 2 gm, oil of anise 1 gm. A. Vomácka states that this resembles Pierre's *Eau dentifrice.*—*Rundschau,* June 20, 1883.

PATENT MEDICINES.

By William L. Turner, Philadelphia.

To read pharmaceutical publications, and the proceedings of some of the bodies which represent pharmacists, one would suppose that the subject of Patent Medicines was the paramount interest now engaging attention in this community. Indeed such would seem to be the case, if one might judge, as we do in cereals, by market reports and quotations, with this remarkable difference—breadstuff is to some extent regulated in its quotations by the ordinary law of demand and supply, while patent medicine quotations seem to be regulated by a desire to increase the demand regardless of the supply which would appear to be, and probably is, inexhaustible.

The well-known fact, that almost fabulous wealth has been accumulated in this field of enterprise, and even in some, yea many, cases, upon a single preparation, would appear to indicate that the percentage of profit on this class of preparations has been to the manufacturer and proprietor enormously large, which, instead of producing upon the public mind abundant and conclusive evidence of their comparative worthlessness, has rather tended to increase the credulity of the deceived, as well as the wealth of the deceiver. The amount sold, and the expenditure of money in effecting its sale, is heralded as an indication of merit by those who push them, as though they were the disinterested parties, who expended their time and substance for the alleviation of the ills of life, and the exclusive benefit of their fellows.

Now, one might naturally inquire, what interest have pharmacists in this traffic, that so much should be said about it? And this brings me to the point of inquiry, what is the plain and positive duty of pharmacists in dealing with this question, and to what extent are they responsible for the building up and sustaining of this wretched traffic?

That a pharmacist should deal in nostrums of this character is not because they constitute an essential part of his calling, but in response to a general demand. They have been designated medicines, and,

though scarcely worthy to be so called, it is but natural that those who use them as such, should seek them where medicines are sold. When we consider that three-fourths of the nauseous doses swallowed by the entire community in this country, are the false and deceptive compounds known as patent medicines, it is scarcely to be wondered at that they have constituted an element of individual wealth to their proprietors, or have added to the profits of dealers in response to this demand. But while a pharmacist combines, and necessarily so, the character of a tradesman with that of a profession, is he, in his capacity as a tradesman, justified in sinking his professional character so low, as to aid in this wide-spread evil? Is it not rather his duty to use his influence in an earnest endeavor to suppress so great an abuse?

I do not pretend to say that pharmacists can arrest the evil, but they can withdraw their active support; they can, at least, cease to make of themselves advertising agents for preparations, which they would be ashamed to compound and dispense as their own. They can, beyond all question, furnish preparations which would be a much nearer equivalent, in every sense, for the price obtained. They can certainly impart rational information, rather than circulate false knowledge, fabulous assertions and lying certificates. They can surely give a little rational advice, or impart a moiety of information, which will curtail the enfeebling of age, the breaking down of mature life, the sapping of the foundations of youth, and the slaughter of innocents, which has been brought about by the use and abuse of the vile trash, which is so extensively advertised and sold under the name of proprietary medicines.

There is scarcely a pharmacist who does not know that villainous compounds are heralded by flaming posters, column after column of penny-a-line sophistry, and elaborate letter-press circulars, as the result of scientific study and rare medical skill in the treatment of disease, and as possessing wonderful medical properties, which compounds of bad whiskey and wormwood, or cheap vinegar and aloes, have been concocted from the poorest kind of materials, and by that species of stupidity which, if better informed, would be loth to thrust its own ideas and opinions in the face of knowledge and skill, of which it has never dreamed.

It may be considered smart, in the shrewd business sense which prevails, in this day of misrepresentations, when pecuniary success hoodwinks whole communities, and too often sinks into insignificance that

sense of the beautiful, which recognizes in an honest man the noblest work of God, to be able to impose upon a community, through the medium of printer's ink, a trashy preparation just long enough, to acquire a competency by its sale, and then permit it to sink into that insignificance from which its intrinsic merit alone would never have lifted it, as has frequently been the case of late years in this field of uselessness; but it is time that this species of shrewdness was called by its proper name, its workshops and places of business hidden from the light of day, and its products branded by public authority "counterfeit."

Of what avail are teachers of science, and schools of learning, and the lives devoted to the study and application of materia medica, and the bringing to light of the hidden resources of nature, for the alleviation and cure of human maladies, when such cabalistic signs as St. X, 1860, can be made to invest rum with wonderful healing properties, or a bearded man in a pine forest, kneeling beside an open book and alembic, effect the wonderful transformation of turpentine into an "elixir of life"? Or of what avail are those who have passed through the curriculum of the one, or traversed the highways or by-paths of the other, if their object, inclination and effort is to aid or assist in this empirical crusade in the interest of ignorance and deceit, and against the best interests of mankind?

Let pharmacists and physicians, at least, stand shoulder to shoulder in this matter, resisting it in all its forms, whether made direct as patent medicines, or by the more insidious approach as propietary specialties, through the medium of regular channels. Not upon the narrow platform of self or mutual interest, but upon the broader one of duty, of philanthropy, of right, fully assured that their better counsels will harmonize with the better sense of the community in an effort to extirpate rather than sustain this nefarious traffic.

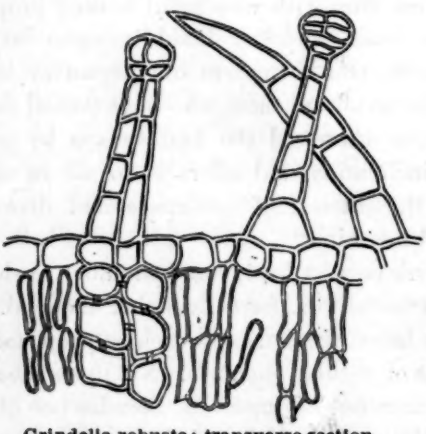
Perchloride of Iron in Diphtheria.—Dr. Andresse, of Teltow ("Deutsche Med. Wochensch."), recommends perchloride of iron in diphtheria, a gargle of five or six drops of the liquor to a small cupful of warm water to be used several times a day by sick and healthy alike, and the affected throat to be thoroughly brushed with the liquor, diluted with two or three times its amount of water. The throat should also be sprayed with the same dilution as is used for gargling. Internally, he prescribes a solution of quinine (one part in 120), of which a teaspoonful should be taken every hour undiluted, in order to obtain the beneficial effect of its local action.—*The London Medical Record; Cinci. Lancet and Clinic*, July 21, 1883.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Grindelia robusta, Nuttall.—The young parts of the cylindrical stem are covered with white, soft hairs. The leaves are thickish, sessile, more or less amplexicaul, spatulate-lanceolate dentate, and pellucid-punctate. The secondary nerves are sparingly branched, and at some distance from the margin form slings. The flower heads terminate the branches. The involucre consists of several rows of narrow spatulate, smooth, sharp-edged scales, which are curved back at the apex and are covered with a brown glutinous mass. The receptacle is somewhat convex; the florets are tubular, yellow and hermaphrodite.

The resinous covering of the leaves is secreted by the glandular



Grindelia robusta; transverse section through upper surface of leaf, 250 diam.

Scaly trichoma, *a* from above, *b* section, 400 diam.

hairs, which are always simple, frequently with a double row of cells, and occasionally parenchymatic; the terminal gland is four-to several-celled. Similar but pointed hairs are likewise observed. The mesophyll is a loose tissue with indistinct palissade layer, supported by thicker-walled cell-rows, which extend transversely through the leaf. The thin-walled cells contain much tannin.

Quite characteristic trichomes are found upon the involucral scales in depressions near the recurved apex, and consist of a mass of cells without a stipe.—*J. Moeller, in Phar. Centralhalle*, 1883, No. 19.

Camellia oleifera, s. Cam. drupifera, Hooker.—Hugh McCallum

obtained from the seeds, deprived of the husk, by means of ether, forty-four per cent. of a somewhat viscid yellowish oil, odorless and having an unpleasant aftertaste. In China it is known as *cha yan*, or *tea oil*, and is chiefly used as a hair dressing and as an illuminant. In addition to the oil, about 10 per cent. of a glucoside, giving all the reactions of *saponin*, was obtained from the seeds. Even then the marc, on being shaken with water, gave a persistent lather. This saponin is a friable, amorphous white powder, having only a slight creamy tinge, and a sweetish, afterwards bitter, disagreeable and biting taste. Almost odorless when dry, it has a peculiar disagreeable odor when dissolved in water. The dust irritates the nostrils. It is insoluble in ether, sparingly soluble in absolute alcohol, freely in 84 per cent. alcohol, and very soluble in water, the latter solution having an acid reaction, and giving white precipitates with barium hydrate, basic lead acetate, and, on heating, with normal lead acetate. The solution emulsifies oils and chloroform, and, shaken with mercury, the latter is finely divided. It gives ·9 per cent. of ash. Heated with hydrochloric acid, a flocculent, white precipitate (sapogenin) is thrown down, and a glucose remains in solution. The saponin was prepared by exhausting the seed, deprived of oil, with 84 per cent. alcohol, concentrating the tincture to a syrupy liquid, precipitating with absolute alcohol, redissolving in 84 per cent. alcohol, treating with animal charcoal and filtering.

The press cake left on expressing the oil, is called *cha-tsai-peng*, and its powder *cha-tsai-fau*. These are used for washing, for removing grease stains, for destroying worms, grubs, etc., and for poisoning fish, when kept in tanks.—*Phar. Jour. and Trans.*, July 14, 1883.

The Fruit of the Brazilian Coffee Tree has been examined by Dr. Th. Peckolt, a portion of the investigation having been made and published in 1864.

	Weight of berry.	Pulp.	Mucilage and testa.	Coffee bean.	Ash of pulp.
Fresh,	1·780	·658	·282	·840 gm.	1·717
Dried at 100°C.,	·584	·159	·150	·272 "	27·750

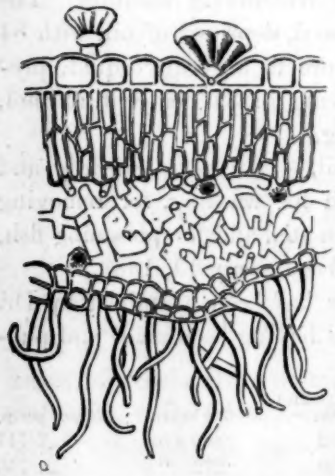
The fresh pulp contains in 1,000 parts,

Caffeine,	·270
Dark yellow, thick oil,	5·000
Wax and red violet color,	5·550
Soft resin, yellow, inodorous, tasteless, insoluble in alkalies,	1·240
Resin, brown yellow, insoluble in ether, sparingly soluble in alkalies,	15·900
Coffeotannin, not identical with that of coffee beans,	14·620

Citric acid, tartrates, malates, trace of gallic acid,	7·950
Glucose,	67·400
Albuminous matter,	11·100
Extractive matter,	34·880
Pectin, mucilage, dextrin, salts,	40·890
Water,	759·800
Ash,	17·170

The ash is interesting for containing iodine, as shown by C. Weinhold, in 1865, who found 0·882 per cent. The author has met with it constantly, the percentage varying between ·474 and ·105, but in other parts of the tree it could not be detected. The ash of the pulp contains also large amounts of phosphoric acid, 9·987 per cent., ferric oxide, 11·38 per cent., and silica 15·162 per cent.—*Zeitsch. Oest. Apoth. Ver.*, 1883, No. 22.

Eriodictyon Californicum, Bentham—The leaves are described by J. Moeller. They are leathery, lanceolate, about four inches (10 cm.) long, about half an inch (1 to 1·5 cm.) broad, short petiolate, repand-dentate, green and glossy above, dark reticulate and gray beneath. The upper epidermis is large-celled and covered with a moderately tough and delicately wavy-furrowed cuticle, the grooves containing many-celled glands upon two- or three-celled stipes. The secretion of the glands is yellowish green, resinous, soluble in alkalies, contains numerous needle-shaped crystals, and covers the upper surface sometimes to the thickness of ·02 mm. Under the thick palissade layer is the mesophyll composed of stellate cells, which, between the veins, are in contact with the small-celled epidermis of the lower surface; many of these epidermal cells are elongated to thin gray felt-like hairs. The primary nerves contain on the lower side a thick layer of collenchyma, and a palissade layer is formed in the angles of the secondary nerves. The epidermis alongside of the nerves is smooth, and contains only few glandular hairs like those of the upper surface. The parenchyma is free from tannin; many cells contain groups of oxalate crystals. Strong alco-



Eriodictyon Californicum. Transverse section of leaf. 250 diam.

hol takes up 30 to 40 per cent. of resin, having a tolu-like odor. W. H. McLaughlin obtained two resins, one of which was soluble in ether, bitter principle, gum, tannin, fat, volatile oil, sugar, and another crystalline principle.—*Phar. Centralhalle*, 1883, No. 19.

Duboisia myoporoides, R. Brown.—J. Moeller made the following observations on the leaves; they resemble willow leaves in outline, attain a length of 12 cm. (4⅘ inches), and width of 3 cm. (1⅕ inch), are short petiolate, entire, the margin slightly revolute, and have a prominent midrib, the secondary veins diverging at nearly right angles and forming slings near the margin. A parenchymatic excrescence along the upper side, upon the midrib is characteristic for the leaves, and may be observed with the naked eye. The upper epidermis has few stomata and somewhat smaller, flatter, and more thick-walled cells than the lower epidermis, which contains numerous stomata and scattered clavate hairs. On placing a microscopic section in warm potassa solution, a large number of acicular crystals make their appearance upon the lower, but not upon the upper side of the leaf. The crystals are soluble in water and alcohol, and make their appearance after the leaf has been kept for several hours in water, but not after it has been extracted with alcohol.—*Phar. Centralhalle*, 1883, No. 20

Tinctura Lappæ fructus.[1]—In No. 5 of the *Ephemeris* a letter by Dr. W. C. Reiter, of Pittsburg, was published, giving a detailed statement of his experience with the fruit (often called seeds) of Lappa major, and the manner of using it in psoriasis inveterata. Dr. Reiter prepared a tincture by macerating 1 lb. of the ground fresh fruit in 1 gallon of two years old whiskey, in a warm place, for two weeks; of the decanted or filtered tincture he gave from a teaspoonful to a tablespoonful. Much stress is laid on the menstruum to be used.

Having received a prescription for the tincture, to be used by a patient suffering for many years with the disease, I tried the whiskey; but the tincture was not a sightly preparation. After several experiments with menstruums of different strength I adopted the following formula:

Ground burdock fruit	16 troyounces
Alcohol	3 pints
Water	1 pint.

Mix the liquids and percolate in the usual way until 4 pints of tincture are obtained.

The dose used is a teaspoonful 3 or 4 times a day. The remedy seems to be effective; after several months' use, the patient's hands and nails are assuming a normal condition.

Lancaster, Pa. CHAS. A. HEINITSH.

[1] Read at the Pharmaceutical Meeting, October 16th.

MATE OR PARAGUAY TEA

By Dr. Theodore Peckolt.

This plant, which belongs to the holly family (Ilicineæ), has several names in different parts of South America. In the Guarani language it is *Caá*, which is the Indian word for leaf. The prepared leaves were named by the Spanish "yerba" (herb), and the infusion "mate"[1] from the native name for the vessel in which the tea is made, and the drug is now generally known as mate in Brazilian commerce, although the Spaniards call it "yerva mate" or "yerva de palos." The name "congonha" has been said by some writers to be applied to mate, but this is an error, for the Brazilians understand by the names "congonha mansa" and "congonha brava," other trees belonging to the same natural order, which are used as a substitute for mate when it is not easily procurable.

The plant was first briefly described by St. Hilaire, in 1822, when he gave to it the name *Ilex paraguariensis*, which he altered in 1826, to *Ilex Mate*, subsequently publishing the first name again in 1833 and this is now adopted in the "Flora Brasiliensis." In 1824 the plant was described in detail by Lambert, under the name of *I. paraguensis* and the plant illustrated from specimens obtained from the Jesuit Missions. The synonyms stand as follows:

Ilex paraguariensis, St. Hil.; *I. Mate*, St. Hil., *I. paraguayensis*, Hooker, fil.; *I. paraguensis*, D. Don.; *I. paraguariensis*, *α*, *obtusifolia*, Mart.; *β*, *acutifolia*, Mart.; *Cassine Gongonha*, Raben.; *C. Gouguba*, Guibourt; *Chomelia amara*, Vell.

The mate plant attains the height of an apple tree, becoming even larger in favorable situations, but when cultivated and deprived from time to time of its leaves, it remains small and forms a mere bush. The leaves are shortly stalked, simple, wedge-shaped, obovate or elongate-lanceolate, toothed, dark green above, paler beneath, shining, of leathery consistence, 1 to 3 inches long, and ½ to 1½ inch broad. The flowers are axillary, situated on one to three times forked peduncles, white, and of similar size to those of the common holly. The calyx consists of four nearly orbicular sepals with a four-parted corolla and four short stamens, the ovary being crowned with a four-lobed stigma. The fruit is red and of the size of a pepper-corn, containing four seeds enclosed in a slightly glutinous pulp, but often one seed only is developed. The home of the Paraguay tea plant is said by Martius to lie between 18° and 30° S. latitude, but the district in which the tea grows most luxuriantly is between 21° and 24° S. latitude in the watershed of the Paraguay river on the west, and in that of the Parana on the east, and it is here in a zone between the Serra Amambuhy on the south and the Serra Maracajú on the north that the best and most highly prized mate is prepared.

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[1] The word is not accented, as sometimes written.—T. P.

How long the South American Indians had been in the habit of using mate is not known, but when the Spaniards seized the provinces on the rivers Paraguay and Uruguay they found this custom prevailed there exactly as first mentioned in the writings of Azara, who stated that the tree grew wild in different parts of Paraguay. In proof of the high estimation in which it was held by the Indians it may be mentioned that the name "caa," which signifies in the Tupi language a tree or plant, was given by way of distinction to mate, that being the tree valued above all others. The use of mate does not appear, however, to have extended to extra-tropical districts, but to have been confined to the more intelligent tribes known now under the name of Guarani Indians. Nevertheless, when these people were driven further north by Europeans, they do not appear to have carried the use of the drug with them, probably thinking it not worth while to obtain it from a distance and from a hostile people when they found a substitute close at hand in the Guarana plant.

The extensive use of mate in South America at the present time is probably due in great measure to the Jesuits, who encouraged its use, finding that it restrained the desire of the Indians for spirituous drinks, while its cultivation, collection and preparation gave employment to converted Indians and brought wealth to the order. In the Jesuit Republic, the Indians were not paid in money but in produce; 4 lbs. of meat, a definite amount of Indian corn and 1 oz. of mate were allowed to each family.

After the expulsion of the Jesuits, the preparation of mate was continued in the Paraguay Republic under the administration of the Dictator Francia and his successors, until the Dictator Solano Lopes was killed in battle with the Brazilians in 1870. An overseer was appointed over the work, who also was paid in kind, receiving for each aroba of the tea natural produce of the value of ½ ounce of gold. Since 1870 there has been free trade in the article, which renders an increase of the trade very desirable. At the present time mate is used only by about 12,000,000 of people, and the consumption amounts to about 8,000,000 pounds.

It has been stated that mate is not prepared solely from *I. paraguariensis*, St. Hil., but that the leaves of other species are mixed with it.

In 1842, Sir W. J. Hooker published in the *London Journal of Botany* (vol. i, p. 30) an exhaustive account of yerba mate, together with the characteristics of the different varieties which he considered identical with *Ilex paraguariensis*. This paper strengthened the previous opinion of Miers that probably more than one species was used in the preparation of the tea. The investigations made by Miers and the monk Leandro, Director of the Botanical Gardens in Rio Janeiro, confirmed by Bonpland, indicate that six different species are used for the purpose: 1. *Ilex theezans*, Bonpl., growing in Paraguay, Entre Rios and Brazil; 2. *Ilex ovalifolia*, growing in the neighborhood of Rio Pardo; 3. *Ilex amara*, Bonpl., on the mountains of Santa Cruz and in the forests of the Brazilian province of Parana; 4. *Ilex crepitans*, Bonpl., in the interior of Santa Cruz and the banks of the Parana river; 5. *Ilex gigantea*, Bonpl., on the banks of the Parana river. This is the "caa-una" of the Guaranis. 6. *Ilex Humboldtiana*, Bonpl., in the province of Rio Grande do Sul. This is the "caa-unina" of the Bra-

zilians. The last four species, more especially *I. amara*, yield the "caachira" of the Guaranis and the "caa-una" of the Brazilians. Martius, however, in the "Flora of Brazil," states that in the central districts of Paraguay, where the *I. paraguariensis* is especially abundant, only the leaves of this species are used; in other districts the various species of *Ilex* are similarly employed.

It is certain, however, that *I. paraguariensis* is the only species in cultivation, but this is carried on to a very limited extent as the wild plant is still abundant. The Jesuits planted the tree because they found that under cultivation the leaves had a milder and more pleasant taste. For cultivation the seeds are carefully freed by washing from the glutinous matter in which they are imbedded, without which treatment they would not germinate, this office being probably performed in a natural state by birds, since the Indians believe that the seed will not germinate unless they have been voided by birds. The young plants are taken out of the hotbed when about 6 inches high and planted out about 12 to 15 feet apart, in a damp, somewhat marshy ground, so as to allow of a small trench being made around the plants in which water can collect. They must also be grown under the trees which afford shade, as the young plants are easily killed by a strong sun. When they are about 3 to 6 feet high some of the shade plants are removed, and in four years the leaf harvest can be begun. The young trees should not, however, be entirely deprived of their leaves lest they should not be able to recover. In the seventh year they will yield 30 to 40 kilos of leaves. It is calculated that on 220 square metres of land one thousand six hundred trees can be grown, yielding on an average 25 kilos of leaves per tree, or about 25,454 kilos of leaves, valued at 190,000 marks per 100 square meters. The cultivated plant remains a small bush and never reaches the stature or size of the wild tree. The cultivation of mate has been carried out with much success in the province of Parana by Dr. E. Westphalen, and it promises to be successful in the Dutch colony of S. Leopoldo in the province of Rio Grande do Sul, where the plant grows luxuriantly.

The tree has been planted in the Cape of Good Hope and seems to succeed well there, as well as in Spain and Portugal. The quality of Paraguay tea depends upon the time of year in which it is collected, the leaves possessing most aroma when the fruit is nearly ripe. In the Argentine Republic and in the Brazilian province of Rio Grande do Sul the leaves are collected from February to the end of July. The new shoots are put forth in August, but at that time it would ruin the trees to gather the leaves. In the forest of the Brazilian province of Parana and Santa Catherina the harvest is collected from March to the end of September. In Paraguay it begins in December and continues till August. About a month beforehand the collectors set out in caravans with their wives and children into the forests where the mate trees are abundant, and make their encampment.

The first operation is to prepare a torrefier, which is made in the shape of an arbor. The twigs are cut off from the branches and slightly scorched by drawing them quickly across the fire. The twigs are then collected into bundles suspended over the torrefier, a small fire of dried wood being kept alight beneath. In about two days the drying is completed, the ashes

are removed, and in the spot where the fire was an ox-hide is spread out, on which the leaves are beaten from the twigs with a wooden blade. The dried leaves are then powdered and packed in wooden cases made out of hollowed trunks of trees.

In the province of Parana the leaves have lately been dried in large wrought-iron pans, in the same manner as Chinese tea, or in specially constructed ovens in which they can be prepared so as to retain more aroma; they are then powdered by machinery and sifted; this kind of mate obtains a better price.

Another form in which the leaves are prepared is by carefully separating them from the stalks and twigs and roasting them, but this is not so much esteemed as the powder, except in Chili, where the leaves are preferred.

In the South American Republic and the Brazilian province of Rio Grande do Sul, mate is packed in serons of ox-hide holding 30 kilograms, and in half-serons, containing 15 kilograms; this packing gives to the mate a disagreeable flavor which detracts from its value.

In Parana it is packed in cane baskets; these are lined with dried grass, called Jacaes, and contain 50 to 60 kilograms. The mate in leaves is here sold at 280 to 290 reis (about 56 pence), powdered mate is sold in thick and better-woven cane baskets, containing in a half-seron, 15, and as a seron, 60 kilograms, the price being 10 to 12 per cent. more than the leaves.

In the Spanish Republic three different sorts are sold under the following names:

1st. Caá-cuy, or Caá-cuys: these are the new leaves of the scarcely developed shoots. They are of more delicate texture, and of a yellowish color. They possess an agreeable and pleasant flavor, but are seldom met with in commerce.

2d. Caá-mirim. This was the chief product in the time of the Jesuits, and consists of the leaves carefully separated from the twigs and stalks, the mid-rib of the leaf being also removed. This kind is chiefly esteemed in Peru, and principally exported there by the Brazilians. It is called Herva mansa.

3d. Caá-guacu, or Caá-una, or Yerva de Palos, is the most inferior kind consisting of the large and old leaves with the twigs and fragments of wood, and possessing a strong and bitter flavor.

In Rio Janeiro two sorts are known to commerce, mate in leaf and mate in powder. In order to test the quality of mate, the merchant takes a small quantity in his hand and blows upon it. If the greater portion is blown away he considers that it has been heated too much and thus deprived of its strength. If it is not easily blown away it is then considered of good quality.

Mate has been the subject of several analyses. In 1836, Trommsdorff analyzed mate and found tannin, two resins, extractive matter, and a substance which he believed to be an alkaloid, but he possessed too little material for complete investigation.

In 1843, Stenhouse found in mate an alkaloid and proved that it was identical with caffeine.

In 1850, Dr. Rochleder investigated Paraguay tea and found the reactions of mate-tannic acid to be identical with those of coffee-tannic acid.

Lenoble, who, as well as Dr. Rochleder, supposed mate to be produced by *Psoralea glandulosa*, named the crystalline active principle he obtained from it, "psoralein."

He also found in it wax, albumen and volatile oil.

According to Dr. Byasson, mate contains as much caffeine as the best Chinese tea. The variety which he experimented upon was caá-guacu. He found also a viscid substance resembling birdlime, soluble in ether; this he considered to be a fatty body of the nature of a compound ether whose alcohol was allied to cholesterin.

His analysis was as follows:

	Grams.
Caffeine	1·850
Substance resembling birdlime, fat substance and coloring matter	3·870
Complex glucoside	2·380
Resin	0·630
Mineral matter	3·920
Malic acid	Not estimated.

Robin has examined several different kinds of mate. The amount of caffeine in young leaves dried without special care was 0·02 to 0·03 per cent.

Mate prepared by the Indians and containing twigs and fragments of fruit yielded 0·16 per cent, and mate from the Mission of the Province of Corrientes, 0·14 per cent. The peculiar tannic acid, which Dr. Byasson did not find, varies between 1 per cent. and 1·6 per cent. The ash of young leaves varies from 0·12 to 0·2.

Professor A. W. Hoffmann, of Berlin, found 0·3 per cent. of caffeine. The average of the published analyses indicates about ½ per cent. of caffeine, that of Indian tea being 2 per cent. The value of mate, as in the case of tea, depends not merely upon the caffeine but also upon the tannin and aromatic principles. He considered the tannin to be identical in every respect with that found in tea.

The aromatic principle has not been isolated, but by dry distillation a volatile oil is obtained, which belongs to the phenol group and is soluble in alcohol.

In 1877 the mate-tannic acid was examined by Dr. Pedro N. Arata, who found that the tannin of mate, while analogous to that of coffee, was not identical. The chief differences noticed by him are as follows: Lime water gives with the coffee-tannic acid a small precipitate soluble in excess, but an abundant insoluble precipitate with the tannin of mate. This, however, does not hold good with all samples of mate, the precipitate being sometimes soluble in an excess of the tannin. Coffee-tannic acid gives by dry distillation pyrocatechin, while the tannin of mate yields in addition to pyrocatechin the isomeric body resorcin.

Coffee-tannic acid is soluble in 52·84 vol. of alcohol, while mate-tannic acid requires 73·66 vol.

Dr. Arata considers that coffee-tannic acid may be regarded as dioxypara-

cinnamylic acid, whilst mate-tannic acid must be classed in the group of oxyphenylpropionic acid.

Soubeiran and Delondre state that mate contains the same essential constituents as the coffee leaf, and in greater amount than the coffee seeds, which I can confirm after numerous experiments with large and small quantities.

In the years 1860 to 1865 I analyzed mate and Congoha leaves. My analyses were made with fresh leaves of the *Ilex paraguariensis* from the Orgel Mountains in Neufreiburg, and roasted and unroasted leaves from the province of Parana.

The following constituents were found in 1000 grams of the air dried substances.

	Little twigs from Neufreiburg.	Leaves from		Mate from Parana.
		Orgel Mountains.	Parana.	
Stearoptene	.....	0·021	0·019	.....
Volatile oil, extracted by ether	.....	0·099	0·179	5·550
Fat and waxy substance	.....	19·800	18·800	.....
Green coloring matter	.....	10·900	10·800	.....
Chlorophyll and soft resin	9·400	20·966	51·200	6·102
Brown acid resin	19·700	48·500	84·500	25·500
Caffeine	2·579	6·398	16·750	5·550
Aromatic substance	.....	.....	2·500	.....
Bitter extractive	30·000	2·038	.....	.....
Mate-tannic acid, pure		27·472	44·975	16·785
Pyromate-tannic acid	.....	.....	.....	1·465
Mate-viridic acid, crystallized	.....	0·024	0·025	0·024
Sugar, saccharine extractive	.....	39·266	6·720	1·370
Albumen, salts, dextrin, etc.	.....	47·666	36·102	18·189
Extractive matter	938·321	8·815	65·130	16·610
Moisture		166·660	104·600	908·379
Cellulose and loss		601·386	557·700	

The ash of mate analyzed by Dr. Busse and Mr. Riemann was found to contain potassium, sodium, magnesium, manganese, calcium, aluminium, iron, phosphoric acid, sulphuric acid, carbonic acid, chlorine, silicic acid; but the analyses vary so much in different samples as to lose some of their value. I found in leaves of mate gathered in Neufreiburg oxide of manganese, 8·958; sodium, 10·062; and potassium, 14·615 per cent., whereas these were not found at all by the above-mentioned analysis in leaves obtained from Rio.—Abstracted from *Zeitschr. Oesterr. Apoth. Verein.* in *Phar. Jour. and Trans.*, August 18, 1883, pp. 121–124.

VARIETIES.

KORONIKO.—Dr. J. Jardine, writing from Kiukiang, in the "Chinese Imperial Maritime Customs Medical Reports," says that dysentery, acute and chronic, was very prevalent in that community during the autumn of 1880. Acute dysentery had generally become sub-acute or chronic before the patients applied at the hospitals, so that the chronic form had generally to be dealt with. "As every one knows, these are the difficult cases to influence speedily by drugs, and with the Chinese a change of air or sea voyage is beside the question. In these cases I was induced to try *koroniko*, from the *Veronica parviflora*, which is largely used in New Zealand as a remedy in dysentery and diarrhœa, and some of the results exceeded my most sanguine expectations. Many who received the drug did not return to report themselves; but I have notes of three cases of chronic dysentery, varying in duration from six weeks to four years, and voiding from twenty to thirty motions containing blood and mucus daily. Fifteen doses of tincture of koroniko reduced them to one-half, other fifteen doses reduced them to three or four daily, and a third like quantity effected a complete cure. Judging from the few cases I have been able to follow, I augur a brillant future for this remedy in the chronic forms of the disease."—*Practitioner, Quarterly Therap. Rev.* July, 1883.

CHAMOMILE IN INFANTILE DIARRHŒA.—Dr. Christopher Elliott, Physician to the British Hospital for Sick Children("Practitioner," December, 1882,) endorses Ringer's claim for the great value of infusion of chamomile in infantile diarrhœa connected with dentition, and in which the stools are many in number, green in color, or are slimy and streaked with blood, and accompanied by pain and cramp. He gives ʒss.—ʒj. of the infusion to a child under one year, and double the quantity to a child over that age, giving it three times a day or oftener, according to the severity of the attack. He explains the rationale of this treatment by the power which chamomile flowers possess of subduing reflex excitability, a power residing in the volatile oil contained in them. Grisan was unable to tetanize, by means of strychnia, a decapitated frog which had been fortified with a dose of chamomile oil, and *vice versa*, when reflex excitability had been artificially produced by means of strychnia, it could be calmed again by chamomile oil.—*The Medical Age. Obstetr. Gaz.* June, 1883.

SODIUM HYPOSULPHITE.—Dr. W. E. Buck writes in the "British Medical Journal" on the inefficiency of disinfectants in allaying the fetor of cancerous ulcers. The disinfectants tried were carbolic acid, sanitas, terebene, resorcin, creasote, boroglyceride, chloride of zinc, charcoal, etc. After failure with these, he tried a saturated solution of hyposulphite of sodium added to an equal quantity of water, and found it exceedingly efficacious. The ulcerating surface was well syringed and washed with the solution, and then covered with rags steeped in the solution. The granulations were kept clean, and the fetor was well kept under. This disinfectant is cleanly, has no smell, does not stain, and is very cheap.

SALICYLIC ACID TO AVOID VARIOLA.—The editor of the "Southern Clinic" certifies, along with Dr. Claridge and Dr. DeCailhol, to the abortive power of salicylic acid in variola, given in the ordinary doses. Dr. Bryce thus concludes: "I believe salicylic acid used early and freely will place small-pox in the category with measles, chicken-pox and other trifling complaints.—*Louisv. Med. News*, July 21, 1883

JACOUD'S GLYCERIN MIXTURE, recommended in cases where cod-liver oil is not well tolerated, is made as follows:

℞ Glycerinæ..... ʒx.
Sp. vini gall. or rum..... ʒ
Ol. menth. piperit..... gtt. i.
M.

This quantity may be divided into two or three doses, and taken just after or between meals.

This mixture has an agreeable taste, is facile of digestion, and does not cause disgust, even after having been used several months without intermission. Prof. Jacoud has obtained marked benefit from its use in several cases of phthisis.—*Med. and. Surg. Rep.*, July 28, 1883.

BRITISH PHARMACEUTICAL CONFERENCE.

The twentieth annual meeting of the Conference was held at the Prince of Wales Hotel, Southport, commencing September 18th; the President, Professor Attfield, in the chair. The attendance of the members and friends was as large as on any recent occasion, the capacity of the room set apart for the business of the meeting being taxed to the utmost. After an address of welcome by the chairman of the Local Committee, to which the President replied, the delegates present from various societies were received and the reports of the Executive Committee and of the Treasurer were read and adopted.

The President then delivered his annual address having chosen for its subject, "*The future supply of drugs to the public.*" It deals with the relation of the State to pharmacy, and forms a fitting continuation of the address of last year in which Professor Attfield discussed the relation of pharmacy to the State. On the present occasion the speaker, starting with the proposition that Parliament intended by its legislation in the year 1868 to "provide for the proper supply of trustworthy drugs to the public," and to ensure that no person should act towards the public as a chemist and druggist unless he had satisfied State examiners that he was properly qualified and had his name enrolled on a State register, proceeded to discuss the various ways in which this intention of the legislature has been thwarted and the unfortunate consequences to the public and pharmacists. It must be admitted that the picture drawn of the present condition and future prospects (if there be any) of the large majority of pharmacists in Great Britain will appear to many a sombre one, but the characteristic energy of professor Attfield had placed within his reach a mass of evidence which he used

with effect in support of his position. The remedy for the evil which commends itself to Professor Attfield's judgment is, in accordance with views expressed last year, the extension of the letter and spirit of the existing Pharmacy Act, so that not only the dealing in a few virulent poisons, but the "retail sale in open shops of most of the simple and compound medicines of the British Pharmacopœia" should be carried on only by qualified druggists. That these views found favor with his audience is not surprising, and it may be hoped that the steps which are to be taken to bring them under the notice of members of both Houses of Parliament will be productive of good results. Meanwhile it is a good omen that some of the leading organs of public opinion have practically endorsed more or less the claim for consideration of their grievances put forward by Professor Attfield on behalf of the pharmacists of Great Britain.

With respect to the position of the Conference it is satisfactory to find from the report presented by the Executive Committee that it continues to enjoy a fair share of prosperity. The special effort made to bring the Association under the notice of chemists and druggists who had not already joined it, is stated to have already resulted in a considerable accession of members, whilst the Treasurer was able to report that the income had been more than sufficient to cover the expenditure.

At the conclusion of the address the Conference was adjourned for luncheon, which was provided by the liberality of the Local Committee in an adjoining room, after which many members took the opportunity of visting the Aquarium and Winter Garden.

In the afternoon the reading of papers was commenced and according to the usual custom the reports upon subjects for the investigation of which money had been granted from the Conference funds were taken first, priority among these being given to a second report by Mr. A. H. Jackson on "*The Differences between the Essential Oils of Cinnamon and Cassia.*" In his previous report Mr. Jackson dealt chiefly with the physical behavior of the two oils and stated his opinion that, whilst there was some difference in their specific gravity and refractive energy, there was nothing sufficiently characteristic to supply a satisfactory method of distinguishing between them. In the present report more particular attention is paid to the chemical aspect of the question. The most promising experiment consisted in a comparison of the behavior of the residues of the two oils after the removal of all the cinnamaldehyde by treatment with potassium bisulphite and ether; but although some slight differences have been noted they are not sufficiently definite to encourage further work in that direction.

The next report was on the "*Bitter Principles of Nerium odorum,*" by Mr. H. G. Greenish, who described two substances, one crystalline and the other amorphous, and both freely soluble in spirit, separated from a solution obtained by shaking an aqueous percolate of the powdered root with chloroform until all the bitterness had been removed. The exact nature of these two substances will form the subject of a future report. In passing a vote of thanks to the reporter the opportunity was taken to pay a well-deserved compliment to Professor Dymock, who supplied the crude drug

operated upon, and who is continually contributing in one way or another to the elucidation of the history of Indian drugs.

The "*Quantitative Separation of Strychnine and Brucine*" formed the subject of the third report, which was by Messrs. Dunstan and Short, and in the words of the President constitutes a distinct advance in knowledge respecting these alkaloids. The process devised by the authors for the separation of the two alkaloids is based upon the difference in the solubility of the ferrocyanides of strychnine and brucine, produced by the double decomposition of the alkaloidal sulphates and potassium ferrocyanide. Strychnine ferrocyanide is but very slightly soluble in water, whilst brucine is much more soluble; but it has been found that in neutral solution a larger quantity of the strychnine salt remains in solution if the brucine salt be present, and in alkaline solutions the separation is not so complete as is desirable. If, however, the solution of the sulphates be acidified with sulphuric acid, the strychnine is entirely precipitated by potassium ferrocyanide, both alone and in the presence of brucine, the brucine not being precipitated under similar conditions until the strength of the solution approaches saturation and then slowly and in large silky needles, differing from the granular and heavy precipitate of the strychnine salt. In another report, upon the "*Tincture of Nux-Vomica*," the authors stated that, as might be expected, the difference in alkaloidal strength which in a former paper they showed to exist in the nux-vomica seeds of commerce is perpetuated in the galenical preparation. They gave the results obtained in the analysis of twelve specimens of tincture of nux-vomica obtained from different sources, from which it appears that whilst the strongest tincture contained 0·360 per cent. of total alkaloid, of which one-third was strychnine and the remainder brucine, the weakest only contained 0·124 per cent., or just over one-third as much total alkaloid. The relative proportion between the two alkaloids was tolerably constant thoughout the series of specimens, with the exception of one, in which they were present in equal quantity. These variations in the alkaloidal strength of tincture of nux-vomica comfirm the conclusions arrived at some years since by Mr. Siebold, based on the relative bitterness of dilutions of some specimens, and point to the necessity for in some way standardizing the strength of this powerful preparation, if not to the advisability of abandoning it as far as possible in favor of the liquor strychniæ. Such a course would be affected, necessarily, by a knowledge of the physiological behavior of brucine free from strychnine, and the process of the authors for separating the two alkaloids appears to furnish a favorable opportunity for clearing up this point.

After the reports had been disposed of, the first paper read was on the "*Preservation of Medicinal Herbs by Ensilage*," by Professor Quinlan, and described the results of some experiments in which medicinal herbs were submitted to treatment analogous to that followed in the process of ensilage of green fodder. The herbs in a fresh states were bruised to a pulp in a mortar, and the pulp packed closely into glass bottles, leaving only room for the stoppers, which were covered with beeswax, the bottles being afterwards buried in the earth. After treatment in this way belladonna, conium, and other herbs were found to be "perfectly sweet and fit

for pharmaceutical use" at the end of four months. It is evident, however, that although herbs so preserved may be still "fit for pharmaceutical" use it does not necessarily follow that they will exactly represent the "live plant," upon the relative superiority of which Dr. Quinlan enlarged, since if the process is really equivalent to ensilage the vegetable substance will undergo a certain amount of fermentation, probably lactic, which might affect the active principle, whilst, as pertinently remarked by Mr. Stanford, the product would no more represent the fresh herb than sour kraut does the fresh cabbage. However, the subject is of considerable interest, and pharmacists are indebted to Dr Quinlan for directing attention to it and for his promise to continue his experiments under varying conditions that were suggested in the course of the discussion.

The next paper read was by the same author and dealt with the Medicinal Properties of the Mullein Plant, which he described as being useful in the early stages of pulmonary consumption in a manner similar to cod liver oil or Russian koumiss. The particular mullein to which he referred, the *Verbascum Thapsus* of botanists, is frequently spoken by ancient Irish medical writers and has long been used in Ireland for the relief of phthisical patients. The preparation specially recommended is a decoction of the fresh leaves in milk, either in its natural state or previously peptonized. So great is the demand for this plant that it is cultivated in several parts of Ireland, and it would be interesting to ascertain the exact effect of cultivation upon it. The sample of the fresh plant shown by Dr. Quinlan, was said to be the kind used, although a "poor specimen;" but it differed so much in the color, texture and shape of the leaf from the characters usually observed in the *Verbascum Thapsus* plant as met with wild in this country that it might have been taken for another species. It may be useful to point out that the resemblance between the leaves of young mullein plants and those of young foxglove plants calls for the exercise of discrimination.

With this paper the business proceedings of the Conference, on Tuesday, terminated, and the majority of the members went to witness a display of swimming in the Victoria Baths, which by the courtesy of the directors was thrown open to them.

On Wednesday morning the proceedings were resumed with the reading of some "*Additional Notes on the Bitter principle of Hymenodictyon excelsum*," by Mr. W. A. H. Naylor. It will be remembered that in a paper read a short time since at an Evening Meeting of the Pharmaceutical Society, the author gave some preliminary information respecting a bitter alkaloidal substance that he had isolated from the bark of this Cinchonaceous plant, and which he then thought to be closely allied to, if not identical with paricine. (See "Am. Jour. Phar.," 1883, p. 419.) Further investigation has proved it to be a new alkaloid having a composition corresponding to the empirical formula $C_{24}H_{40}N_2$, and therefore an addition to the small class of bases devoid of oxygen. Besides "hymenodictyonine," which is the name given to the new alkaloid, Mr. Naylor has separated a bitter neutral principle, represented by the formula $C_{22}H_{42}O_{10}$, which he thinks may possibly be a decomposition product of a glucoside.

The next paper was a very practical one by Mr. Willmott, entitled

"*Remarks on Experiments with the Ointment Bases*," which in consequence of its great length was summarized by the author. The object of the experiments was to contribute towards clearing up the pharmaceutical side of the question as to what is the best substance to be used as a basis for ointments in respect to securing efficiency and stability, the substances experimented upon being lard, oil and wax, and mineral hydrocarbons, and the experiments having been continued over a considerable period. It will be impossible to convey any adequate idea as to the nature of this paper without the publication of the instructive tables by which it is accompanied and the conclusions arrived at can only be mentioned here in the briefest manner. The author infers from the results of his experiments that the washing and straining, or washing and filtering, of lard are without advantage in its preparation for use as an ointment basis, the best results having followed the simple process of melting and straining. In any case the condition of rancidity in lard is quickly developed, though it may be obviated to a very large extent by the use of benzoin. Mixtures of oil and wax are stable when the yellow unbleached wax is used, but not when the official "white wax" is used. Of the various hydrocarbons hitherto in use as ointment bases, the author is inclined to award the palm to vaseline, but he says that he has found it to develop a disagreeable odor, especially when melted with paraffin, "white wax" or spermaceti, or in the presence of carbonate or acetate of lead, but the odor is not developed when yellow wax is mixed with it. Another new hydrocarbon basis, called "white ozokerine," was reported to have given more satisfactory results.

Mr. Siebold then read a note on the "*Processes of the British and United States Pharmacopœia for the Determination of Hydrocyanic Acid*," in which he stated that subject to the correction as to the volume of silver nitrate solution required to indicate a certain strength, first pointed out as necessary by Mr. Cripps, and if precautions be taken for the absence of chlorides from the magnesia and hydrochloric acid from the hydrocyanic acid, the U. S. P. process is as reliable and delicate as that of the B. P. In the discussion a preference for the B. P. process was expressed by Mr. J. Williams on the ground that hydrochloric acid is almost invariably added to hydrocyanic acid as a preservative, and Mr. Siebold pointed out that where it was desired to repeat the determination one process might be conveniently used to check the other.

In a paper on "*Iodine in Cod Liver Oil*," Mr. E. C. C. Stanford described the results of experiments made with the object of testing the statement attributed to Garrod that "Cod liver oil" contains 0·06 per cent. The author says that if this statement were true, cod liver oil would be the richest source of iodine with which we are acquainted; but although he found iodine present in every specimen examined, it never exceeded 0·000434 per cent. the mean of six specimens being 0·000322 per cent. Nearly double this mean quantity (0·000517 per cent.) of iodine was found in fresh cod liver, and the metalloid was also ascertained to be present in the flesh of the cod and the Scotch herring, in herring brine and in fulmar oil. It may be remarked that this "statement that cod liver oil contains 0·06 per cent. of iodine," which in the "blue list" and by various writers

has been repeatedly referred to Garrod, does not correctly describe what is said by that author, whose words are: "the proportion of iodine is not more than 0·05 per cent."

The time having nearly arrived for the adjournment to luncheon, Mr. Holmes briefly communicated some information respecting the trees yielding benzoin, and exhibited specimens of the leaves and sections of the trunk of the Siam benzoin tree, and leaves, flowers and fruit of the Sumatra benzoin tree which have recently been received from Mr. Jamie, of Singapore.

Upon resuming, the next two papers read were by Mr. Conroy and Mr. Maben and discussed *the Suitability of Sesame Oil for Pharmaceutical Purposes.* Mr. Conroy is of that opinion that seasame oil cannot replace olive oil for the chief pharmaceutical uses, since from the large proportion of olein it contains plasters made with it do not "set," whilst lime liniment made with it shows a tendency to separate. But in preparations where no chemical combination takes place, and where only a bland sweet oil possessing good keeping properties is required, perhaps no better could be chosen, and he thinks it might serve as a substitute for almond oil in the preparation of ointments. Mr. Maben's opinion of sesame oil is somewhat more favorable, since he thinks that it might not only take the place of olive or almond oil in the preparation of ointments,—except ung. hydrarg. nit.,—but that it could be made applicable to plasters by a modification of the proportions of the ingredients.

In a note on "*The State of Combination in which Morphia exists in Opium,*" Mr. D. B. Dott gave his reasons for believing that morphia exists in opium both as sulphate and meconate. Although sulphuric acid is present in opium in sufficient quantity to combine with the whole of the morphia, there are also other bases present with which it will unite in preference, and the residue of the acid is not sufficient to satisfy the whole of the alkaloid. On the other hand, meconic acid is not present in sufficient quantity to take up all the alkaloid, and probably forms an acid salt with the portion with which it does combine.

The apparently interminable subject of "*Sweet Spirit of Nitre*" formed the topic of a paper by Mr. A. C. Abraham. This gentleman has been led to the conviction that the generally received explanation of the official process for spirit of nitrous ether is erroneous and to impute the moderate action and constant temperature peculiar to that process rather to the action of the sulphuric acid upon nitrate of copper, or to the increase of the boiling point by the admixture of sulphuric acid, than to the formation of nitrous acid. After some experiments in which the copper was first converted into nitrate, the author eventually abandoned this for calcium nitrate and he gave a formula for a process which he says presents the advantages over the official one of giving a greater yield at a smaller cost, with a less prolonged, more regular distillation and a smaller quantity to be distilled, whilst the action which takes place is more analogous to that in the older processes. In the course of the discussion Mr. J. Williams made some suggestive observations as to the possible composition of this preparation. He said that he had prepared ten per cent. solutions of pure nitrous ether and of aldehyd, but that neither

resembled "spirit of nitrous ether," and the same remark was true of a mixture of the two; but a solution of paraldehyd sufficiently resembled it to raise the question whether the aldehyd was not present in the preparation in this condensed form, its action being perhaps modified by that of nitrous ether.

The results of an examination of some *Samples of Pitch* were then communicated by Mr. E. Davies, with a table of their composition, from which it appeared that the organic matter dissolved by petroleum spirit from samples of Trinidad and Syrian pitch contained 5 or 6 per cent. of sulphur, a much higher proportion than exists in any known vegetable substance. The President took the opportunity of pointing out that the asphalt used for paving purposes contains more than 90 per cent. of inorganic matter and is incombustible.

A "*Contribution to the Pharmacy of the Pomegranate*," was next read by Mr. L. Siebold, in which a preparation was described which consists essentially of a solution in syrup of orange peel of an extract made from an aqueous infusion of the powdered root bark of *Punica Granatum*, which has been deprived of all astringent matter by treatment with sugar of lead. It is said to have a pleasant fruity flavor, and be very effective.

The subject of the next paper, which was by Mr. Conroy, was a sample of *spurious scammony*, which appeared to consist of "skillip" scammony and upwards of 83 per cent. of the resin from the root.

In a paper on "*Aconitine for Internal Administration*," Mr. T. B. Groves refers to the small extent to which medicine has up to the present time profited by the researches of chemists upon the aconite alkaloids, due, no doubt, mainly to the uncertainty arising from the varying nature of commercial "aconitines." He recommends that any person setting about the preparation of aconitine for internal administration should satisfy himself that the roots he uses are the product of *A. Napellus*, and that the alkaloid should be separated in a crystalline condition, an operation which is described as requiring ordinary skill helped by extraordinary patience. The nitrate is the salt most ready to crystallize, and from it the pure alkaloid or any of its salts can be prepared without difficulty.

In a paper on the "*Composition of Eaton's Syrup*," Messrs. R. H. Davies and E. B. Schmidt reported the results obtained during an examination of several samples of this preparation. It was found that they varied widely in composition among one another and from a sample prepared according to Dr. Eaton's formula the strychnia, for instance, ranging from 0·6 to 3 grains per four fluid ounces, the theoretical quantity being one grain.

In an interesting paper on the *Odorous Principle of Henbane*, Mr. A. W. Gerrard reported that he has succeded in separating this principle as a pale yellow unctuous semi-crystalline mass, which consists probably of a butyric ether. Mr. Gerrard expresses an opinion that the deposit which sometimes forms in tincture of henbane will be found to consist of a mixture of this principle and chlorophyll.

The last paper read was by Mr. J. B. Barnes, and contained *Suggestions for Combinations of Collodion*, in which a number of instances are men-

tioned where collodion may proably be used advantageously for the topical application of medicaments

At the close of the reading of papers, Professor Attfield presented to Mr. Ashton, in the name of the Conference, for the use of the local pharmacists, a number of handsomely bound volumes, purchased from the Bell and Hills Fund, to which were added "Pharmacographia" and "Science Papers," presented by Mr. Thomas Hanbury in memory of his brother. The place of meeting in 1884 was the next business and a cordial invitation from the pharmacists of Hastings to visit that town having been read it was unanimously accepted. The election of Officers for 1883-4 was then proceeded with, the following being the results: President. J. Williams; Vice-Presidents, M. Carteighe, London; J. R. Young, Edinburgh; S. R. Atkins; Treasurer, C. Ekin, Hounslow; General Secretaries, F. Baden Benger. Manchester; S. Plowman, London; Other Members of Executive Committee, J. Borland, Kilmarnock; J. C. C. Payne, Belfast; W. A. H. Naylor, London; W. V. Radley, Southport; W. Hills, London; G. S. Taylor, London; J. C. Thresh, Buxton; J. B. Stephenson, Edinburgh; Auditor, T. H. Sykes, Southport.

All that now remained to be done was to pass a well-deserved and enthusiastic vote of thanks to the Local Committee,—and especially to Messrs. Radley, Ashton, Ball and Kershaw,—for the admirable arrangements made to secure the success of the Conference; another to the public bodies and private firms that had thrown open their establishments to the visits of the members; and lastly one to the President for his services in the chair. After the Conference had terminated a large number of members adjourned to the splendid Glaciarium, where a number of skaters were disporting themselves on a surface of ice. The process of ice-making which is here brought into play was described and shown. It consists in the vaporization of liquid sulphurous acid in a partial vacuum produced by pumps worked by steam; the reduction in temperature thus produced is communicated to a solution of magnesium chloride flowing through a series of pipes under the floor of the Glaciarium, and the water is thus maintained in a frozen condition.

On Thursday a party of eighty, on the invitation of the Local Committee, left Southport by the 8.10 A.M. train for St. Helens. Special saloon-carriages were provided for the accommodation of members. The weather was, unfortunately, as unfavorable as it well could be. The rain poured down persistently, and a thick mist obscured the view of the country. On nearing St. Helens, hundreds of chimneys and mine-wheels suddenly appearing and disappearing in the gloom produced a most weird effect. On arrival at St. Helens the party divided, the majority proceeding to Messrs. Kurtz and Co.'s Chemical Works. Here Leblanc's process for making sodium carbonate; processes for making caustic soda, bleaching powder, potassium chlorate, etc., were shown, and the principles involved and details of manufacture were explained by several most courteous guides. The other members visited the Union Plate Glass Works, Bishop's Flint Glass Works, and Messrs. Bibby and Son's Copper Smelting Works.

The Union Plate Glass Works stand on ten acres of ground, and employ

a large number of hands. The operation of casting was not going on, but the immense cast iron beds—nine inches thick at the side, and twelve inches in the centre—on which the plates are cast were shown. The cast plates of glass are annealed for about four days in flat ovens and are then ground. The first grinding is with sand, the plate being cemented to a heavy bed with plaster of paris, and a heavy iron plate as large as the glass, being moved back and forth and sideways on the surface by machinery. The next process is similar, but two plates of glass are placed together with emery between, thus grinding each other. This produces a smooth opaque surface, such as is used for door panels, etc. The third grinding is with rouge and felt, which produces a fine polish. The rouge is made by the firm, by roasting copperas.

Space will not allow us to give further detailed account of the various processes exhibited at these places, but it should be stated that Messrs. Bibby and Sons delayed the completion of the final stage of the reduction in order to give the members present an opportunity of viewing it. Luncheon was partaken of at the "Fleece," where Mr. Alderman Harrison occupied the chair. Mr. S. R. Atkins, of Salisbury, in most felicitous terms proposed the Alderman's health, a toast which was cordially received and responded to in appropriate terms. The return to Southport was made at 12.45, so that members might be able to attend a garden party given by the Local Committee at the Botanic Gardens, Churchtown. The rain, if anything, had increased in the meantime, but this did not prevent upwards of four hundred ladies and gentlemen being present. They were of course confined indoors, but good entertainment was provided for them in the spacious conservatory by a company of Chas. Hallé's Choir, who sang a number of part songs, glees and choruses. Mr. Leo Grindon delivered to the general audience a popular lecture on some interesting plants, and exhibited to the scientists, more especially, some beautifully mounted specimens of rarities of the vegetable world. The Fernery and Museum also attracted numerous visitors, and so the time slipped pleasantly by. Just before the breaking up of the party, the weather cleared up somewhat and enabled the members and their friends to view the extensive gardens and ornamental water. Finally, the gathering broke up soon after six amid general expressions of pleasure derived from the meeting, and of appreciation of the efforts so successfully made by the Local Committee for the entertainment of the visiting members during the whole of their visit to Southport.—*Phar. Jour. and Transact.*, Sept. 22.

MINUTES OF THE PHARMACEUTICAL MEETING.

According to notice, the meeting was called to order by the President of the College, Dillwyn Parrish, and the minutes of the last meeting were read and approved.

The Actuary acknowledged the receipt of the catalogue and illustrations of Messrs. McKesson & Robbins, of New York. Mr. Parrish presented a valuable copy of the Codex Medicamentarius, or Pharmacopœa Parisien-

ses, 1732. Also a copy of some illustrations of Barbadoes plants, by Elizabeth Pye. These works were from the library of Mr. Parrish's father.

Professor Maisch presented the fourth volume of the Catalogue of the Library of the Surgeon General's Office. The Report of the Smithsonian Institution for 1881 was also received.

Dr. Wolff read a paper upon *Salicylate of Bismuth* (see page 554), giving a process by which the salt might be prepared. The paper was referred to the publishing committee.

Professor Maisch read a short paper upon *Tincture of Burdock Fruit* (Lappa major), by Mr. C. A. Heinitsh, of Lancaster (see page 569). The paper was referred for publication. Its reading gave rise to some discussion; Mr. Hancock stating that he had prepared the tincture, and it had been prescribed, but without success. Dr. Wolff was of the opinion that it would be advantageous when prescribed for eczema, which was a consequence of disordered digestion, and, as the burdock is intensely bitter, it was from this bitterness and its tonic powers that advantage was to be derived.

Dr. A. W. Miller exhibited and presented to the College cabinet a specimen of a very rare variety of *Asafœtida* imported by Dodge & Olcutt, of New York, costing to import nearly 75 cents per pound, but when it was received was found to be so entirely different from asafœtida of commerce that no sales could be effected; it was evidently prepared from the stalks and leaves of the plant and not from the root; some pieces of the stems were adherent to it. Dr. Miller stated that the natives use it in some culinary operations as a condiment; it is far more repulsive in odor than asafœtida, having an old leather smell in addition to that of asafœtida.

Mr. Trimble exhibited samples of the *Oil of Sweet Birch*, of pure methylic alcohol, quite different in odor from the wood alcohol of commerce, and also a specimen of salicylic acid prepared from the oil by Mr. Pettigrew.

Professor Maisch stated that he had received specimens of the oil of sweet birch (Betula lenta) and also oil of wintergreen distilled from the herb; each of these were distilled in different localities, and where only one of the species grew, so that it would be impossible to have them substituted for each other; those who have familiarized themselves with the two oils recognize a difference, which is quite marked.

Mr. E. M. Boring sent a little apparatus denominated *a rod holder*, formed of two discs of wood perforated with a number of holes near the edge; between the two wooden disks a sheet of rubber cloth is secured and this cloth is perforated, where exposed by the openings in the wooden discs, with oval holes, the smaller diameters of which are slightly less than the rods to be held; the friction between the rod and rubber is just adequate to sustain the rods. At one side of the disc a little iron bracket is secured, with which the apparatus is fastened in some place convenient to the prescription counter; it is the invention of Mr. W. Hynson Jennings, of Baltimore.

Professor Maisch exhibited a specimen of the *Stearopten of Oil of Patchouly*. This was presented by Mr. Main of Messrs. Tarrant & Co., New York, and appears to be little known.

Professor Maisch presented, on behalf of Mr. Hans M. Wilder, an old

microscope made by Messrs. Watkins & Hill, of Charing Cross, London. Mr. Wilder supposes that it is about 90 or 100 years old. It could not be older than 230 years, as the field glass was introduced about the year 1650; the Lieberkuhn proves it could not have been made before 1738, when that appendage was first made; an instrument quite similar to this is figured on Plate XII, fourth edition of Micrographia, in 1771, and induces the opinion that it is not older than 1780; the funnel-shaped body was continued to be used down to the year 1810; all the lenses are single ones, no compound lenses were made before 1819. The stand can be inclined for the convenience of the student. Upon motion, which was seconded, the thanks of the meeting were returned to Mr. Wilder for this interesting addition to the cabinet of apparatus belonging to the College.

Professor Maisch exhibited Koenig's *Chart of Food Substances*, the various components of which, and their percentage, nutritive value. ash, and moisture are represented by lines of different tints, the fat being shown by yellow color, the carbo-hydrates by blue, and nitrogenated matter by red; the proportion required for different ages is also given upon the chart.

Mr. Berry exhibited a *Pressure Percolator*. The peculiarities of the apparatus are that the drug to be treated is secured between two diaphragms of phosphor bronze, drawn together by a double screw of the same material. When arranged, it is placed in the percolator, which has a funnel at the lower portion and a close top into which a tube is secured; to this tube a gum hose is fastened, which connects with a reservoir elevated to any desired height; the rapidity of the flow is determined by a stopcock attached to the reservoir and a pinchcock constricting the gum hose. It is claimed that the last portions of alcohol can be removed from the drug without mixing with the water employed to force it through.

In the discussion which followed the exhibition, Prof. Maish showed that mere pressure percolation was by no means new, in fact it was the oldest method of percolation. Count Réal's filter press, which was first publicly noticed in 1816, and is described in Mohr, Redwood and Procter's Pharmacy, was constructed in such a way as to secure pressure by a column of liquid. Boullay had experimented very fully on the subject and, in 1833, announced that he could accomplish all he desired without pressure, by carefully observing the necessary conditions. After the perfection of the process of displacement in the United States, the old and abandoned process had again been brought forward and, two years ago, Mr. Rosenwasser had introduced a percolator (see *Amer. Jour. Phar.* 1881, p. 568), from which the one now exhibited did not differ, except, perhaps in the material used for and the manner of fastening the diaphragms. The new feature of Rosenwasser's percolator, as compared with Réal's filter press, consisted in the confining of the vegetable powder, so as to prevent its expansion beyond a certain limit, after having been moistened. But Prof. Maisch thought that critical experiments as to the complete exhaustion of the powder under such a condition, had as yet not been made.

A member of the class present asked the attention of the meeting to the fact that packages of some American made *Carbonate of Magnesium*, marked four ounces, were short in weight; some of them weighing but

two and a half ounces. The makers stated that it was owing to a loss of water, and that the packages were of proper weight when first put up. Jenning's magnesia had been generally found to be of full weight.

There being no further business, the meeting, on motion, was adjourned.

T. S. WEIGAND.

EDITORIAL DEPARTMENT.

THE FUTURE SUPPLY OF DRUGS TO THE PUBLIC is the subject of the address which was delivered before the British Pharmaceutical Conference by the retiring President, Professor Attfield, and which has also a significant bearing upon pharmaceutical affairs in this country. Professor Attfield shows that the pharmacy law of 1868 is being openly evaded in many parts of Great Britain by unqualified and incompetent persons, and that the protection of the public in obtaining trustworthy medicines in cases of need is thereby rendered nugatory in many districts. Grocers, general shopkeepers, and others sell not only domestic drugs, but likewise more or less potent ones, including poisons, and not unfrequently those which by law have been entrusted to the custody of registered chemists and druggists. These dealers sell drugs like other merchandise with a small profit, such as is customary in common trade, or at a nominal profit, as decoys for the pretended low price of other wares. The qualified pharmacist is certainly entitled, in all fairness, to a better compensation, for he has spent time and money for the purpose of acquiring the knowledge and skill necessary for carrying on such a responsible business, and which are continually required for determining quality, for the making of preparations, and for guarding against accidents and mistakes. Whether or not such compensation be charged as a "fee" appears to us quite immaterial, as long as it is understood that the charge is made not only for the actual value of the article, but also for the "brainwork" of the dispenser. We do not know whether dentists get a fee as a remuneration for supplying a set of teeth, but it is well understood that this sum represents not merely the value of the material.

The surreptitious invading of the pharmacist's domain by mere vendors is seriously felt in many localities, and has not only materially affected the market value of many business stands, but is also manifested in this, that while the population of Great Britain has increased by nearly 11 per cent. within ten years, in the same time the number of registered chemists has increased only two per cent., and since chemists are on the register who do not actually practise pharmacy, the number of practising pharmacists has probably decreased. The income from pharmaceutical work has largely decreased, and the profit, actual and relative, has decreased. Obviously the supply of medicines from co-operative stores and the simplification of physicians' prescriptions come in for a considerable share of such a result, as also the dispensaries, where advice and medicines are furnished gratuitously to large numbers of persons who can well afford to pay. Physicians by recommending proprietary preparations, as they not unfrequently do,

instruct the public in prescribing for themselves; and self-dosing is fostered by the advertisers of secret remedies. "Another minor cause of the depression in pharmacy," says Prof. Attfield, "is found in the fact that many chemists and druggists have thoughtlessly encouraged the purchase wholesale and distribution retail of what are termed packed or packeted goods, be they patent medicines, proprietary preparations, simple or compound drugs, coated pills, or what not, instead of themselves preparing such articles. . . . Worse still, their action, or rather inaction, tends to deprive the public of that safeguard against the supply of bad drugs which the pharmacy acts were designed to afford."

We have not the space to refer to other points discussed by Professor Attfield, but the foregoing is a brief resumé of the important facts and causes, some of which are due to the Pharmacy Act of Great Britain, which restricts the sale of only a limited number of poisons to properly qualified pharmacists, but leaves the sale of non-scheduled poisons and other potent medicines open to all. The legal restriction of the title of "chemist and druggist" to those qualified under the act, has not prevented the uneducated vendors from palming themselves off as such. It is argued that the remedy lies in an extension of the spirit and letter of the Pharmacy Act, that the list deemed poisons should be considerably extended, saving all rightful interests of persons who would be unfairly prejudiced, and that the retail sale in open shop of most of the simple and compound medicines of the Pharmacopœia should be carried on only by qualified pharmacists.

The danger to which the public is exposed is not only felt in Great Britain, the same causes nearly have made serious inroads upon pharmacy in the western hemisphere, indeed, some of them are more or less at work in the different countries of Continental Europe. The able address of Professor Attfield is therefore not merely of local importance, but deserves the careful attention of all who are interested in the welfare of pharmacy and who have at heart the best interests of the public in obtaining, when needed, a supply of trustworthy medicines.

THE NATIONAL RETAIL DRUGGISTS ASSOCIATION was organized at Washington, D. C., on Monday, September 10. Mr. T. Roberts Baker, of Richmond, Va., acting as temporary president. The object of the association is "to unite all retail druggists for the purpose of obtaining protection in their business interests from evils known to exist, and for mutual support and co-operation." The officers elected are Henry Canning, Boston, President; N. H. Jennings, Baltimore, T. R. Baker, Richmond, Va., and J. B. Bond, Little Rock, Ark., Vice-presidents; J. W. Colcord, Lynn, Mass., Secretary, and J. D. Wells, Cincinnati, Treasurer. An Executive Committee of fifteen was also elected, to which the President and Secretary were added as members ex officio. The principal discussion turned about the trade in proprietary articles and its disruption in consequence of competition and cutting of prices in all parts of the country. Two plans for the remedy of this evil were freely discussed, known as the rebate plan and coupon plan, the former of which seemed to have the sanction of the large majority of those present as most likely to remedy the evil

complained of, it received the endorsement of the Association and was referred to the Executive Committee for such modification and alteration as may be deemed proper to incorporate, and with plenary powers to act for the Association in the presentation of said plan, as modified, to a successful issue. A committee, consisting of W. S. Thompson, of Washington, Alonzo Robbins, of Philadelphia, and T. R. Baker, of Richmond, was also appointed to urge upon Congress the repeal or modification of the tax upon alcohol when used exclusively for medicinal or mechanical purposes.

In union there is strength, and if the apothecaries throughout the United States join this new organization, the aim and object of which have been stated above, there is no doubt but a great deal of good may be accomplished towards this end, even if the plan which may ultimately be elaborated, should not work as smoothly as anticipated. The annual dues amount to only $1. Applications for membership should be sent to the Secretary.

PROPRIETARY VERSUS FAMILY MEDICINES.—The Trade Association of Philadelphia Apothecaries is endeavoring to remove or lessen the evils which have of late years grown through the reduction of the retail prices of proprietary medicines, and to restrict their sale as much as possible, to pharmacists. We do not propose to discuss the measures suggested, but merely wish to allude to the standing of proprietary remedies as pharmaceutical preparations and to the proper supply of family medicines.

Regarding the former two views are entertained; according to the one they are looked upon as ordinary merchandise, which do not form part of a legitimate pharmaceutical business, and which should therefore be allowed to take care of themselves. According to the other view, they should pass solely through the hands of pharmacists. This view has been very ably presented in the address of Professor Attfield, outlined above; his argument is as follows: "In the interest alike of pharmacists, physician and patient, this patent medicine question needs careful consideration, with a view to reform. Patent medicines may and do contain on the one hand powerful poisons, on the other useless substances. The well-trained druggist either already knows or can form a shrewd judgment of the nature of these (officially stamped) articles, and, by timely caution and advice, can prevent much mischief resulting from the careless or ignorant use of a potent remedy, or from a too thoughtless reliance on worthless materials. No other shopkeeper has similar knowledge. The sale of patent medicines should, therefore, be restricted to qualified and registered chemists and druggists." But whether the first or second view be taken, it is obvious, that these secret medicines deserve the attention of our lawmakers, as soon as sufficient intelligence can be collected together in our legislatures to grapple with a question, which is not one merely of trade, but primarily one of public health.

In cases of need the public look upon the physician for advice and to the pharmacist for medicine; in minor ailments or in affections which are considered such, the vast majority of people will have recourse to hygienic measures and to such simple remedies as experience has shown to possess

some value. Since the big and unstable potions of repulsive taste have been changed to stable preparations of inviting appearance and pleasant taste, and since the boluses of ancient times have dwindled down to small pills and granules, it is natural that such should be preferred to the former. It is the pharmacist's office to supply such medicines when needed, and neglecting or having neglected to do that, he has little cause for complaining if that, what he should supply, is prepared and furnished by another more alive to supply the wants of the public. The plan of preparing a series of family medicines, suitable for slight ailments such as are likely to occur in given localities, has been often proposed and discussed in this Journal and elsewhere; it has been inaugurated successfully by a manufacturing firm of Detroit, and we think it should be carried out in every city and county through the friendly council of physicians and pharmacists. Such medicines would not be nostrums, since their composition would be known, and selling them in the place of proprietary articles or of the old-fashioned domestic remedies could not be objected to as illegitimate counter-prescribing. The advances made in chemistry have materially restricted what formerly belonged to the special field of pharmacy; but what still, and should always be, pharmacy's most appropriate sphere, viz., the selection of crude drugs and their conversion into preparations suitable for medicinal use, in all possible forms, should be assiduously cultivated. If every pharmacist had done his full duty in this respect, and if every physician had not listened to the allurements of interested parties, the legion of nostrums and of specialties would not be as powerful as it is at the present time.

THE INTERNATIONAL PHARMACEUTICAL EXHIBITION which was held in Vienna has been not only a financial success, but has deservedly attracted a good deal of interest, as may be judged from the visits to it by the Emperor of Austria and of many members of his House and Court. It cannot be our object to enumerate the different exhibits, or describe even the most prominent ones; but we desire merely to mention the most important features, as adjudged by the accounts contained in European pharmaceutical journals.

The exhibits of public institutions were partly of antiquarian interest, illustrating the history of pharmacy during the past three or four centuries. The fixtures used more than a century ago in the Jesuits' pharmacy, then located in the Rossau, were put up and furnished with ancient receptacles made of wood, clay, majolica, glass, silver, etc.; with utensils of bygone days, a large brass mortar bearing the date 1607; with original prescriptions from the last century, etc. Many printed and manuscript works, some dating back to 1546, old documents, engravings, and drugs used in the middle ages, served to illustrate the practice of pharmacy in the past. Modern pharmacy was of course well represented by large collections of drugs from various museums, as were also the appliances and requisites for pharmaceutical education, consisting of herbarium specimens, models of flowers, microscopic sections, plates, diagrams, apparatus, etc. Hospital pharmacies showed the products of their manufacture, and the medical department of the Austrian army was represented by a laboratory the pro-

ducts of its manufacture, and by field pharmacies this branch of the military service, from the examination and manufacture of the preparations to the dispensing of medicines being in charge of trained pharmacists having attained the degree of "magister of pharmacy."

The exhibits made by firms and individuals comprised in the first group, balances, hydrometers, thermometers, microscopes and other physical instruments. The second group was confined to the literature of pharmacy and collateral sciences, embracing pharmacopœias, text-books, works of reference, journals, etc. In the third group apparatus and machinery for the manufacture of medicinal products were shown, and in the fourth group the fixtures and utensils necessary or applicable for conducting the apothecary business; in this group was shown a novel substitute for corks, consisting of a long shaving of soft wood, tightly rolled up into a coil, but retaining sufficient elasticity for the stopper to be driven into the neck of a bottle and closing it effectually; it is called "Spahnpfropfen," or *shaving stopper*.

The fifth group, as the largest and most important, was divided into five sections, the first of which comprised chemical products, such as numerous alkaloids and their salts, glucosides, volatile oils, synthetically prepared heliotropin and coumarin, products of the dry distillation of wood and coal, etc. The second section for pharmaceutical products contained several exhibits which were of a more or less mixed character, since they showed not only the pharmaceutical products, but likewise to some extent their chemical constituents, the drugs from which they were prepared, and the colletion of which was in some cases illustrated. Amongst these we find particularly mentioned Gehe & Co., of Dresden, with the most extensive general collection of drugs and their products; Parke, Davis & Co., of Detroit, with a large collection of American and recently introduced drugs and their products; Th. Peckolt, of Rio Janeiro, showing the materia medica of Brazil, with chemical and pharmaceutical products; and Dr. J. Schorm, of Vienna, whose exhibit was noteworthy for illustrating the chemistry of conium. The exhibitors in this section numbered 88, the large majority being manufacturers, including a considerable number who are also engaged in the retail drug business. As might have been expected, all kinds of pharmaceutical preparations, prepared according to different Pharmacopœias, and numerous specialties were collected together in this section.

The third section was devoted to drugs; one of its most attractive features was the exhibit by F. Wilhelm & Co., of Vienna, with its artistically arranged collection of drugs in original packages. The fourth section contained wines, spirits, mineral waters and articles of food; the fifth section dressings and allied articles, including soaps and perfumery, and the sixth group was devoted to the history of pharmacy and pharmaceutical antiquities, to which we have alluded above.

On a previous occasion we informed our readers that four American firms had sent exhibits to Vienna; of these, three were awarded prizes by the juries, namely, Parke, Davies & Co., of Detroit, and Seabury & Johnson, of New York, gold medals, and Wm. Wood & Co., a silver medal. The firm of Schimmel & Co., of Leipzig and New York, received a diploma of honor.